

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Kloman's Friction Clutch for Reversing Rolling Mills.

In the spring of 1872, Mr. Andrew Kloman, of Pittsburgh, began the construction of a "Universal" mill designed for rolling narrow plates and heavy bars. It was thought that considerable economy could be effected in the working of the mill if some good device could be applied for reversing the motion of the rolls after each "pass" of the iron. This would avoid the necessity of a three-high mill, and would also dispense with all the usual cumbersome machinery employed in two-high mills for lifting the piece back over the top roll after the completion of each pass forward. The advantages to be gained by a two-high reversing mill were very great, considering the purpose for which this mill was intended. Mr. Kloman's plan included the construction of a long table on either side of the mill, provided with feed rollers, to be driven from the mill, and whose motion should correspond with that of the mill. The office of these feed rollers would be first to carry the piece, as it came from the heating furnace, into the rolls, the piece passing through the rolls and being received by the rollers on the other side of the mill, which carried it as it came from the rolls until the pass was completed.

The motion of the entire mechanism would then be reversed, the top roll having previously been screwed down sufficiently to give the piece the required reduction in the next pass; the feed rollers would then carry the piece forward into the rolls, to be received again by the rollers on the side of the mill from which it first went into the rolls. This would be repeated until the piece was reduced to the required length and thickness. In describing his experiments Mr. Kloman says:

"I was very much confined in my plans for a reversing gear, being compelled to adopt for the driving power of the mill a large fly-wheel engine already fixed on the ground, which had previously been used for driving an ordinary roll train. I was therefore compelled to go beyond the engine (where the mill might easily have been reversed by the use of engines reversing with the ordinary link motion), and was driven to the adoption of something in the form of a reversing clutch and gear."

Much difficulty was here to be overcome, since the mill was intended to do very heavy work, and of all the forms of reversing clutch then in use, there was none capable of performing all that would here be required of it. Mr. Kloman was nevertheless satisfied that the principle was right, and that the difficulties to be met must be overcome by constructing a clutch in such a manner that it would be capable of answering all the demands which would be made upon it. The machine illustrated in the accompanying cuts was adopted as promising to meet all requirements, and the fact that it has been in successful operation for over four years, and that another machine, built from the same patterns, has been used with entire satisfaction for about two years by the Cleveland Rolling Mill Company, in connection with the blooming train of their steel rail mill, warrants the assumption that it is a complete success. We will describe it somewhat in detail for the benefit of our readers.

In order to have two wheels run loose upon the same shaft in opposite directions where right and not bevelled-faced spur wheels are used, it is necessary to employ, in all, five wheels, as shown in the cuts.

Referring to Fig. 1 of the drawing, we naturally begin at the engine shaft, Z. To this shaft the spur wheel, A, is attached. This wheel is geared into the friction wheel, B, on the one side and into the spur wheel, C, on the other. The wheel, C, is fixed fast to its shaft, as is also the large spur wheel, D, which latter is geared into the second friction wheel, B'. The friction wheels, B and B', which both travel loosely upon their common shaft, S, are thus made capable of having imparted to them motions in opposite directions. Attached to the inner sides of these friction wheels, B and B', are the friction rings, E and E', whose inner surfaces are cut into grooves, as shown, into which corresponding projections on the friction segments, F and F', are made to fit.

The object of this arrangement is to obtain a larger bearing surface for friction

than could be had with plain faces bearing upon each other. The construction of the friction segments, F and F', is better shown in Fig. 3, which is an elevation of the friction ring and friction segment.

The chief feature of this arrangement is the ring, F (Fig. 3), which is divided into three segments, and is concentric with the inner surface of the friction ring, E E' (Fig. 1). These segments (Fig. 3) are each attached to the arms, m, m' and m'' respectively, by means of an arrangement shown at g, which consists of two slots in the arms in which the bolts attached to the segments are allowed to play slightly, thus admitting of the friction segments being brought to bear upon the friction ring and again withdrawn when required.

The arms, m, m' and m'', and the hub, h, are keyed fast to the shaft, s (Fig. 1), and both, of course, have the same motion as that of the shaft.

The friction segments are forced against the friction rings, and the friction grooves thus brought to bear by an arrangement shown in Fig. 3. This consists of a arm, k, carrying at its outer extremity a double screw, whose threads are cut in opposite directions on either side of the arm. Both ends of this double screw are made to fit into

of the perpendicular, the motion being slow enough to allow the mill to come just to a state of rest before the friction segments in the other wheel are brought to bear upon the friction ring, and the mill will thus be reversed in motion with little or no jarring.

In the details of this important improvement we are indebted to a paper communicated by Mr. Kloman to *The Metallurgical Review*.

Progress of the Electric Light.

The following items, showing the progress which is now making in the utilization of the electric light, are taken from recent dates of English journals:

At the Society of Arts last evening a paper on electric lighting was read by Dr. Percy Higgs, who gave an interesting account of the forms of apparatus now chiefly employed, and an estimate of the comparative cost of electricity and of gas as sources of illumination. He assumed that gas could not be manufactured below an average price of 2 per 1000 cubic feet, and that a gas burner, to give the light of 20 candles, must consume 6 cubic feet per hour. On these data the cost of 8000 candles' light for 1500 hours, allow-

ing £24 for interest on the outlay for plant, would be £380. 5/-, but the same amount of light can be obtained from electricity at a cost of £180, the difference in favor of the latter being thus as 2.1 to 1. The calculation of the price of gas is made with reference to places where it is manufactured for many consumers, but if the gas were manufactured solely for the light required by the comparison, the cost would rise ten to twelve times that of the electric lighting. At the same time the two agencies are not at present in actual competition, inasmuch as the electric light is chiefly valuable for purposes which up large spaces, for allowing engineering and other works to be continued during the night, and for various uses in the time of war. Dr. Higgs gave a list of establishments in which the electric light is even now regularly employed, among them the chocolate factories of M. Menier, the works of the new Grand Hotel in Paris, the erection of the Tay Bridge and the works of Messrs. Head, Wrightson & Co., at Stockton-upon-Tees. In concluding his paper the author, while admitting that there is still much to be done before the electric light can be employed with comfort in illuminating rooms or halls of ordinary dimensions, said that it can now be economically used, both with regard to its intensity and color effect, where gas lighting or other modes of lighting are valueless. In lighting large workshops, stores, &c., electricity enters into competition with gas, both in economy and safety from fire.—*London Times*.

The question of the electric light is to be introduced to the world on a large scale at the Exhibition. Experiments which were very successful were made some time since in the Palais de l'Industrie, and the other day the subject was treated at the Sorbonne by M. Jamin, of the Institute, when the light was

shown, naked and elevated in the courtyard, one at each end, to counteract shadows, as it is used at the railway station of La Chapelle and in several machine shops, and in the lecture room within ground glass globes. The professor, having reviewed the whole subject with great clearness, introduced Mr. Jablachkoff, who lighted eight of his "electric candles" in one circuit.—*Journal of Society of Arts*.

A successful experiment with the electric light was made, on the 25th of March, in the central lobby between the two houses of Parliament. The object was to test the power and quality of the light, with a view of its being adopted in the House of Lords. The lighting of the Chamber of Peers is not at present satisfactory, and it is consequently engaging the attention of the First Commissioner of Works. There seems good reason for supposing, from the favorable manner in which Mr. Gerard Noel regarded last night's experiments, that the new light will be adopted when the apparatus used in its production has been completed. The magnets which produce the electric current are caused to rotate by steam, and the engines now employed for heating and ventilating the buildings will supply a sufficient motive power.—*Daily Telegraph*.

on the back shaft. The cone probably made 16 revolutions for one of the spindle, thereby increasing the power enormously. There was a face plate, as large in diameter as would swing, with four slots, and the rest square holes, very stiff; no spring to it. The following head stock was in proportion; a splendid tool. A first-class workman was put on it, and after running it some years left it in good working order without a scratch. Afterward some cheap, inexperienced man got hold of it and made a total wreck of it.

In my opinion, if more attention was paid to power and stiffness and good wearing long bearings in the construction of machinists' tools, and less to ornamental gingerbread flourishes and nonsensical sharp corners, they would give better satisfaction in the long run.

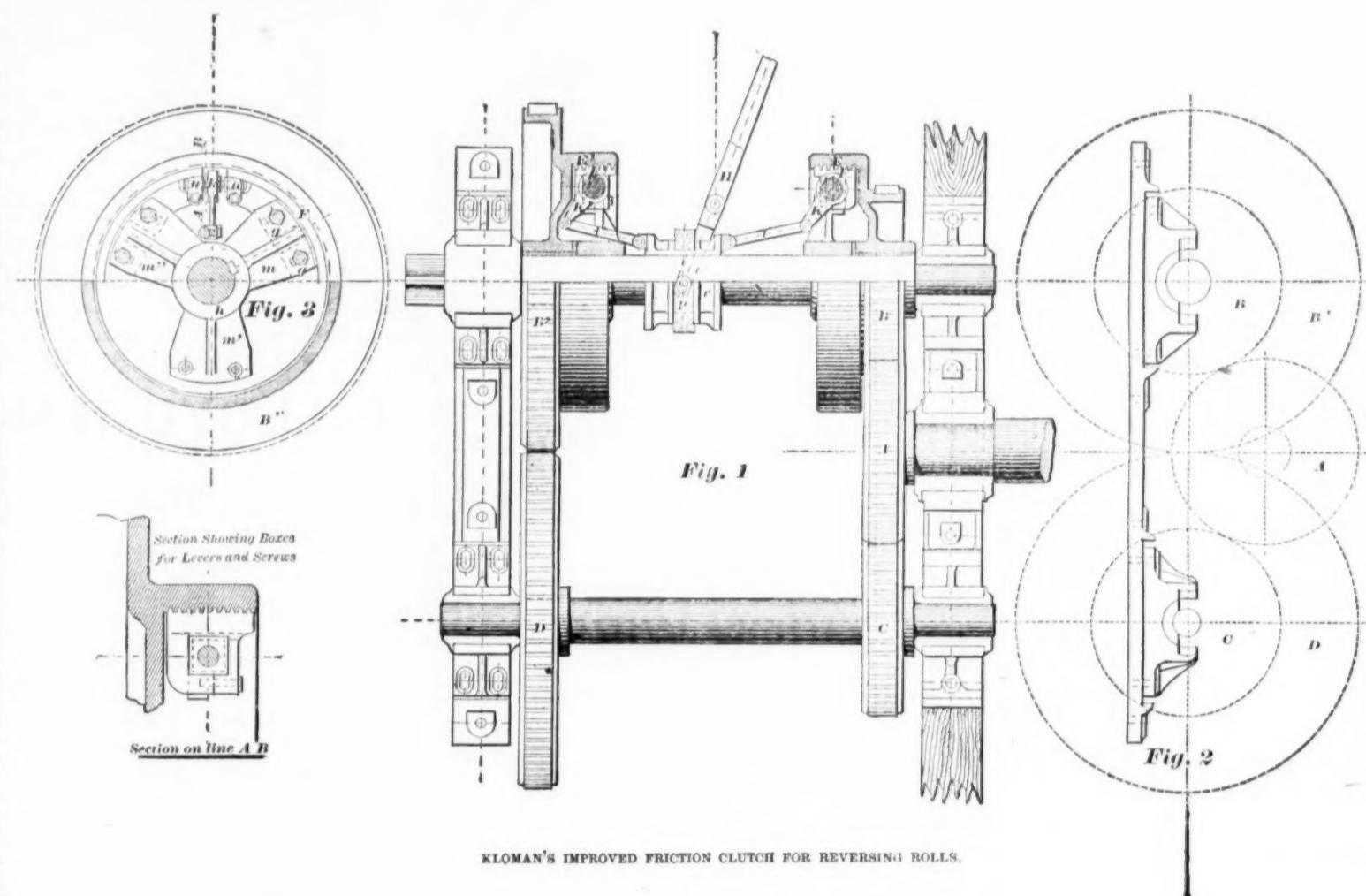
The Microphone.

A paper lately read before the Royal Society announces the invention by Prof. Hughes of this astonishing instrument or apparatus, which opens to our ears a universe of sounds hitherto inaudible—just as the microscope revealed a world of minute life and structure unknown before. Like

Mr. Edison, Prof. Hughes was one day employing the telephone for various acoustic experiments. He wished to investigate the effect of sonorous vibrations upon the electrical behavior of conductors, led to this idea by the way in which selenium is known to become electrically affected by light, and also by the researches of Sir William Thomson upon the electrical conduct of strained wires. The Professor had a stretched wire on his telephonic circuit, and, though he talked and plucked at it, no effect followed until it broke. At that moment the telephone uttered a sort of "shh," which was very curious. He placed the broken ends together under a weight, and obtained again faint sounds, which were improved when the wires were connected by iron nails, or a steel watch-chain—the more pieces and the more diverse in substance from the conductor seemingly the better. Experimenting still further with his broken circuit, especially in the direction of this "whisper from science about 'more pieces,'" he found metallic powder or fine metal filings wonderfully augment the power of transmitting sounds; while shot, in a bright condition, platinum, carbon and mercury also gave good results, particularly the last. Following up this clue, Prof. Hughes hit

upon a plan of suspending finely-divided mercury in a stick of charcoal by heating the latter and plunging it into quicksilver, whereupon the charcoal becomes infiltrated with the mercury in minute but continuous particles. Inserting a "transmitter" of this sort in his circuit, an absolutely amazing sensitiveness to sound, as well as power of conveying it with the utmost fidelity, was displayed by the apparatus. A touch of the finger on the vibrating plate was conducted to the speaking end in volume of vibration like the rustle of a forest; the stroking of a camel's-hair brush on a card was magnified into the sound of a loud whisper; the beat of a pulse or the tick of a watch was found to pass with perfect clearness through a resistance representing 100 miles of space; and, when a fly happened to walk over the plate, the tramp of its feet was most distinctly caught, like that of some six-legged horse trotting, and it was, moreover, heard to trumpet from its raised proboscis like an elephant in an Indian jungle. Sounds, in fact, totally inaudible before to human ears were arrested and reported by this simple and accidental expedient of interrupting the electrical circuit with a finely divided conducting material. There is almost no doubt that the perfected microphone will convey to us that hidden ripple of the sap rising in growing trees and plants, which Humboldt said might be a continuous melody in the auditory organs of earth's smallest creatures.

The Chicago Tribune says: Although there is considerable complaint of dullness, a general survey of the situation justifies the statement that the volume of legitimate trading is larger than at this date in preceding years. This is especially the case with the dry goods, grocery and lumber trades,



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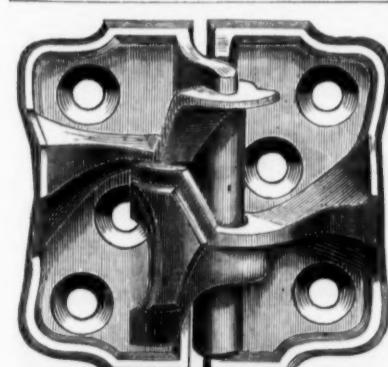
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Grappling for a Cable.

Captain Thomas Stead, commanding the steamship Professor Morse, sailed last week from Brooklyn on a mission of which he lightly speaks as "going to pick up the Cuba cable." The easy, matter-of-fact way in which he seems to view his task hardly prepares one for a realization of what he is really about to undertake. "The cable is broken," he says, "32 miles from Key West, in the Gulf Stream, where the water is from 450 to 500 fathoms deep—say half a mile. We are going to pick it up, mend it, and lay it again. There are two cables between Havana and Key West, one of which stopped working a month or six weeks ago, and we have to find out why it did. It may have been cleanly divided or broken by chafing upon a rocky bottom, or from some other violence, and there may have been a minute perforation no bigger than a pin hole through the gutta percha covering reaching the copper wires, and so permitting the water to come in contact with them and destroy the insulation just as perfectly as if the cable had been chopped in two by an ax. The galvanometer simply tells us that the cable has been wounded so as to impair or destroy its usefulness, at a certain point, and we must discover what the injury is and how it is to be remedied. How do we clutch it at that depth? Easily enough. We have strong grapples, four and five pronged, which we send down at the end of this powerful rope—which is made of wire and manila combined—and when, dragging on the bottom, they catch the cable, hoisting it on board is a simple matter. The hoisting rope passes over that drum, between those guides on the bow, over those two drums, and is coiled around this enormous drum, which is worked by a donkey engine. If our grapples catch too near the end, where there is an actual break, the cable will slip off, of course, and then we must go further along the line and grapple for it again. The tension tells us when we have it, and when we get it on board we attach the galvanometer, and know at once how far from us, either way, the break is.

"When we splice the broken ends or attach a length of new cable, we cut one end wedge-shaped and fit the other to receive it, so as to bring in the closest actual contact the ends of the fine copper wires which we then solder firmly together. Then, over that, we put a wrapping of prepared gutta percha, which makes an absolutely impervious covering, taking great care in doing so no pin holes or bubbles are left to make further trouble. Over that comes the protecting iron wire and its jute servings, the shield that protects the gutta percha. If a new cable has to be laid it is paid out over the stern. Down below are four huge circular tanks, capable of containing together about 300 miles of deep-sea cable. Our cable, you know, varies in size. The 'deep-sea' weighs about 2½ tons, the 'intermediate' about 4½ tons, and the 'shore ends' about 18 tons to the mile. The object in making the shore ends so much the heaviest is to protect the cable as far as possible against injury from ship's anchors and rocks—whatever we use is coiled in those tanks in such manner as to guard against the possibility of its kinking, and when being paid out is carried up through guides to traveler drums, on aft to a great drum, which it passes twice to give us the power to regulate the tension upon it, by means of brakes, and thence over small drums and through guides again into the sea. It is a work that must be done very carefully, with every precaution against straining, twisting, or looping the cable, and is necessarily slow.

"The principal job of cable laying performed by this vessel since I have been in command was the putting down of 110 miles between Key West and Punta Rassa. That was in comparatively shoal water, probably not more than 10 fathoms on an average. But before she belonged to the present company—the International Ocean Telegraph Company, owning the lines between this country and Havana and the West Indies—I believe she laid some shorter cables. We have done a great deal of repairing, however. Only recently we repaired this same cable, a little way off the Cuba shore, in a depth of 140 fathoms. Mr. Theophilus Smith was then the electrician in charge of the job. This time I take along as electrician Mr. George Keith, manager of the Cienfuegos cable. He has just been out in the same capacity on board the Investigator, on an expedition for the repair of the Cienfuegos cable, which was successfully grappled, hauled up and repaired from a depth of 1500 fathoms. We will take along about 1500 men and engage 20 more at Key West."

The Professor Morse is an iron 1000-ton steamship, built at Glasgow especially for this service, at a cost of about \$150,000, and was allowed American registry by special act of Congress. She has four 30-inch cylinder engines, two screws working independently, which enable her to turn around in her own length, and her interior seems a mass of machinery ingeniously adapted to the uses for which she was designed.

The Standard for Coin Weights.—The Philadelphia Record says: The conscience-keeper of the nation's financial faith is deposited at the mint, Broad and Chestnut streets, in the form of a troy pound-weight, which is kept under duplicate locks and seals. There is a curious history connected with this weight. By it is determined the standard to which the accuracy of the gold and silver coins of the United States must attain. The commission appointed by the President to test the coins and make the annual assay, use this weight, and on those occasions it is taken from its carefully guarded seclusion, and it shows the accuracy and inaccuracy of the productions of the various mints in this country. This little cylinder is copied from a troy pound-weight preserved in the Tower of London, and on this latter the coinage of Great Britain rests for reliability. This exact witness of financial integrity is carefully preserved and guarded from tampering hands. At the conclusion of the assay and the commission's labors, the weight is intrusted to the care of the United States District Court, the Collector of the Port and the Director of the Mint, locked up and solemnly sealed for another year, only to appear twelve months

after and show which mint has been derelict in its work.

The Pig Iron and Steel Production of the World.

The following is abstracted from the first annual report issued to the members of the Bristol Iron Trade Association by Mr. J. S. Jeans, secretary:

In the manufacture of pig iron in Great Britain, 450 furnaces were more or less actively employed in 1877, the total number built being 974; while four years previously, of the 1000 furnaces built 671 were in operation. An interesting comparison is afforded by the following abstract, showing the expansion of the pig iron trade in Great Britain and the United States, in each of the following years:

Year.	Great Britain.	United States.
1740	17,359	...
1810	...	53,900
1823	700,000	225,000
1840	1,416,871	205,693
1850	2,000,000	48,000
1854	3,069,838	73,248
1860	3,820,752	98,559
1870	5,063,515	1,850,000
1872	5,741,920	2,834,558
1874	5,921,408	2,689,413
1875	5,355,462	2,266,581
1876	5,555,997	2,093,336

The total pig iron production of the world computed at 13,347,213 tons in the year 1876—when France produced 1,449,536 tons; Germany, 1,862,000 tons; Belgium, 440,958 tons; Russia, 397,500 tons; Sweden, 339,486 tons; Austria, 450,000 tons, and other countries, 225,000 tons.

The Bessemer Steel Trade in 1877.—Within a period of ten years the resources of the Bessemer works have increased two-fold. In 1868 there existed 18 works, with 57 converters of various capacity. In 1877, the number of works was 25, with 114 converters, ranging in capacity from 3 tons to 10 tons, one establishment at Sheffield, that of Sir John Brown & Co., having three of the largest capacity. The production of Bessemer steel ingots in 1877 amounted to 750,000 tons, being an increase of 50,000 tons over the previous year, while the production in 1870 was but 215,000 tons. From official sources, the following statement shows the world's yield of Bessemer steel in the year of 1876:

Countries.	Bessemer Steel Ingots.		Other Steel.
	No. of Makers.	No. of Conv'trs.	
Great Britain	24	110	700,000 140,000
United States	11	27	525,996 74,178
Belgium	2	12	71,758
France	8	28	261,874 29,876
Sweden	12	38	21,789
Germany	19	78	242,261 128,449
Russia	2	4	8,500
Total.	85	227	1,833,178

The Siemens Steel Trade in 1877.—This new and important process consists in reducing the pig iron and other materials to a molten state in a gas furnace, known as the Siemens regenerative gas furnace at an intense heat, and by the due admixture of pig iron, ore, and other materials, regulating the percentage of carbon, other impurities being removed by the process. The process differs from that of the Bessemer, in the fact of coal gas and air, in regulated proportions in combination at an enormously high temperature, passing over the surface of the molten metal; whereas in the Bessemer process, atmospheric air is driven through the liquid metal to remove the carbon therefrom. Soft steel manufactured by the Siemens open hearth process is employed in the manufacture of plates, axles, tires, molded castings, springs and other articles for which mild or soft steel is specially adapted. The cost of production by both systems varies but little. Recent experiments by the Siemens process show the cost at £6. 13/8 per ton, exclusive of royalty. There are at the present time 15 works in Great Britain producing steel by the Siemens and Siemens-Martin processes, employing 90 open-hearth furnaces and about 500 crucibles, working in connection with the regenerative gas furnaces in active steel. The capacity of the open-hearth furnaces in active operation is equal to 250,000 tons per annum, that of the crucibles to 20,000 per annum. The annual yield of both varieties of steel by the Siemens process appears in the annexed summary for each of the years ending 1877, that of the United States being given side by side.

Year.	Great Britain.		United States.	
	Open Hearth.	Crucible	Open Hearth.	Crucible
1873	77,500	5,900	3,500	...
1874	90,500	3,300	7,000	...
1875	88,000	4,000	9,050	...
1876	127,000	3,150	21,490	...
1877	137,000	4,900	...	...

Open hearth soft steel in the manufacture of ship and boiler plates is being largely employed. Recently it has received special recognition by the Admiralty and Lloyd's, and the successful efforts of Dr. Siemens to improve and cheapen the process of manufacture may be expected to aid it in developing a steady if not a rapid growth.

A French traveler among the Kurdish states, as the result of his endeavors to ascertain the process employed by them in the manufacture of their sword blades, that the manufacturers in which these blades are made are situated at the declivity of a mountain, near cascades, the water of which, falling from rock to rock, arrives in the most limpid state in the reservoirs in which the blades are tempered, these reservoirs being also located where the air is very pure—these conditions of purity of air and water being considered essential to the success of the operation. Iron of the purest quality is used, and, submitted to a very high temperature. The first tempering is commenced when the metal is at white heat; it is exposed before fusion, the fuel being placed on each side, and the red-hot iron is then covered as quickly as possible with fatty and oily matters, such as paste made from bones, wax, &c. This process is thought to render the blade flexible. The second tempering is similar, except that the heated iron, after having thrown off considerable quantities of sparks, and having been exposed, is covered with a paste composed of powdered bones and purified mutton suet. The third tempering is effected by disposing the metal in such a manner that it may be seized by a man on horseback who rides at full speed, in order that the blade, which he bears in an elevated position, may receive the impression of the air.

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For determining the per cent. of Pure Iron in an ordinary Ore. \$4.00

For the per cent. of Pure Iron, Sulphur and Phosphorus in do. 12.50

For each additional constituent of usual occurrence. 1.50

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Extra quality small rods, from best selected Scrap Iron.

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Is the Ironclad War Ship a Failure?

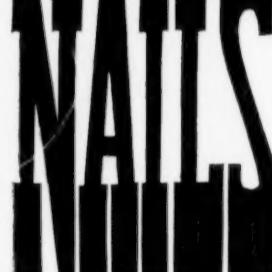
The history of naval architecture, beginning with the days of Henry VIII of England, is chiefly marked by the development of that great embodiment of force, the ship of war. Beyond a doubt shipbuilding for naval, as distinct from mercantile purposes, has been governed by the advances made in the science of gunnery and the manufacture of heavy artillery, and is to-day more than ever under these influences. At a time when the bow and pike were the weapons of offense, the open-decked vessel was necessary for securing the greatest degree of mobility in the fighting crew and the delivery of the most effective discharges of arrows and other missiles. But when the forces of the combat were concentrated in artillery and muskets, cover and impenetrability became the great objects to be attained in building war ships, next to making them as seaworthy as possible. Hence the famous "wooden walls," which represented the might of England as the first naval power in the world after the decline of the Dutch navy. The power of penetration developed in the gun has, however, kept steadily ahead of the power of resistance possessed by the wooden walls, and although the latter were strengthened up to their utmost limit it was found that the gun still maintained its superiority. Without entering into the details of the progress of artillery, we may say that the invention of the long-range Lancaster gun and the necessity of fighting granite-clad forts at Sebastopol during the Crimean war compelled the adoption of armor plating as a defense, first on the floating batteries and finally on the regular war ships of European powers. Let us suggest also that steam as a motor has contributed largely toward sustaining the dominating influence of the gun over the naval architecture of modern times, because it was soon discovered that a single gun mounted by a vessel propelled by steam was worth in action an entire broadside of a cumbersome and slow moving sailing ship.

The limit of the power of guns is far from being reached, if we may judge by the advances made in their construction during the last five years. But we cannot fail to notice that in the contest for supremacy that commenced between artillery and armor-plating when the latter was built the latter is now far behind, and we might say hopelessly distanced. Indeed, we believe the time has arrived when a dispassionate investigation, which fortunately our naval officers are in a position to undertake, will lead to the conclusion that the ironclad ship of war, as represented by even the best types now owned by European nations, has attained its highest degree of perfection, and that it no longer possesses even the relative merit which it once had as an offensive-defensive engine of naval warfare. This has become such an important question for us that we may take advantage even of the deplorable accidents that from time to time befall the great ironclad ships of European nations, and learn useful lessons therefrom for our own guidance. Many considerations combine to justify our satisfaction that the United States is not at present burdened with enormously costly fleets of ironclads, which the experiences of to-day render of doubtful value, and those of the immediate future may prove to be not only wholly valueless, but dangerous to our national interests. The invention of the torpedo in its present state of perfection, and the increase in the penetrative power and weight of projectiles, has revolutionized naval construction and tactics so much that we are warranted in waiting patiently until Europe completes her costly experiments before we begin to form a new navy. The worthlessness of ironclad fleets of the present type has been proved by the events of 1870 and of the late Russo-Turkish war, and we regard even the great fleet of England as incapable of forcing the Bosphorus against Russian guns and torpedoes. There is plainly to be seen, then, that even the powers most interested in maintaining the prestige of the ironclad are losing faith in it after all their enormous expenditures.

There are three elements necessary to constitute a superiority of naval force, and each ship of a fleet or squadron must possess them. They are the highest attainable powers of offense, of defense and of mobility. Without these special powers at command no absolute supremacy can be justly claimed. With them the supremacy will never be disputed. The highest power of offense embraces many conditions, but the chief ones are superiority in artillery and speed and the ability to reach the enemy in his place of refuge by means similar to those he employs to defend himself—namely, the auxiliary torpedo boat. A superior defensive power obviously means an ability to resist with success the greatest efforts of the enemy to inflict damage, and to choose the time and opportunity for action. The superior power of moving at will consists in being able to change position with rapidity and advantage, to attack when desirable, to retreat when necessary, to pursue with success and to escape with certainty. If ships of war possessed all these capabilities they would be irresistible and invulnerable. But it happens that in the case of the ironclad the possession of one or more renders the attainment of the others extremely difficult, if not entirely impossible. To cope with her enemy afloat and ashore the ironclad must carry the heaviest guns, with a proportionate weight of protective armor; she must be built of such size and model as to sustain this extraordinary weight, maintain her equilibrium under all circumstances, and practically serve at all times as a gun platform afloat. Her draft must be increased to give her stability, but this involves an increase of her displacement and of the tax on her propelling power. To secure the requisite degree of speed in order that she can pursue or escape from any enemy, and perform all the work of a fighting ship, her boiler and fuel spaces must be enlarged and her vulnerability increased. An immense coal consumption, without which she is helpless, compels her to abandon her station at short intervals and replenish her bunkers at the nearest depot, her enemy in the meantime escaping unharmed.

Dr. Wm. D. Marks called the attention of the club to some new and interesting drawing instruments. One of the instruments was of Prof. Marks' own design, being an adaptation of the Marquis rule, which enables a draughtsman to shade a cylinder, shaft, &c., with mathematical correctness.

A remarkable accident happened on the Kansas Pacific Railway on the morning of the 22d ult., by which a whole freight train was plunged into a river, and the engine and several cars were buried completely out of sight in the water and quicksand. The great flood of the day previous had swept away the bridge over the Kiowa River, and in the early morning, before light, the train approached and plunged into the gulf at full speed, carrying with it the engine and firemen, and a man who was riding on the engine. The train fell 30 feet, and the cars which were not submerged were piled in utter wreck upon the submerged engine. It required several hours to reach the bodies of the drowned men.



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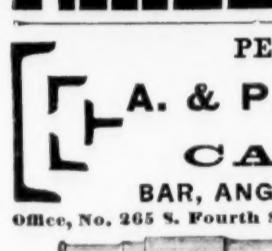
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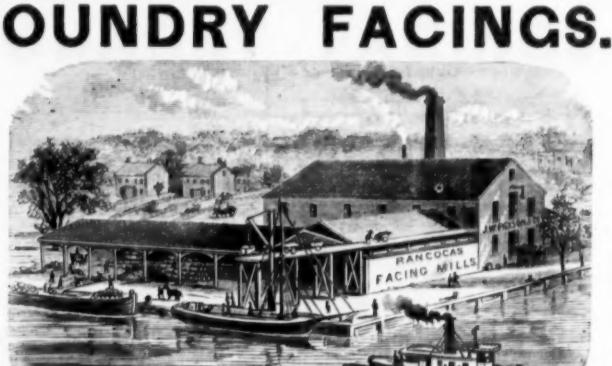
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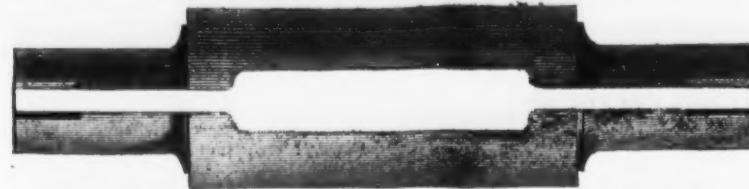
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HOLLOW CHILLED ROLLS.

U. S. PATENTS, Nov. 9, 1869, and Oct. 9, 1877.

ANY REQUIRED DIAMETER OR LENGTH.



Suitable for Plate, Sheet, Nail Plate, Pipe Iron, Bridge Iron. Either Iron or Steel Rolling.

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Manufacturers of Rolls and Rolling Mill Machinery of every description, will receive prompt attention.

As convincing proof of their great superiority we refer to the following testimonial of practical men:

BELLALIE, OHIO, Feb. 4, 1878.

We take pleasure in saying that we have used four Hollow Chill Rolls for 12 months, and find them to be the best chill rolls we have ever used in our mill. The necks are very strong, and the case is more steam, and we can expand the body of Roll very much better than we can the solid Roll. We will order another pair as soon as we start our mill.

BELLALIE NAIL WORKS,

A. L. WETHERAL, Manager.

BELLAIRE, O., Dec. 30, 1877.

I think your Rolls are just what you claim for them. The Iron is there, fine, fine, and all over alike. They are the best for nail plate I ever worked. I can run a set of them three months without dressing, and make as good surface and good edges as you can have. They are ready to work fine Iron at any time without change.

JAS. PATTERSON, NAIL PLATE ROLLER.

PITTSBURGH, April 17, 1878.

We have tried the Hollow Chill Rolls for sheet steel for twelve months, and believe them to be in every way superior to solid rolls. They keep their surface and produce handsome work. They do not heat in the necks. Your Rolls on sheet mill for 12 months, and we have found them to be the best. They also give us great satisfaction, combining surface and strength.

DAVID SHAW,

Manager for ANDERSON & PASSAVANT.

LA BELL STEEL WORKS, April 10, 1878.

We have been using your Hollow Chill Rolls for a year, and are more pleased with them than the solid; have no hot necks or "springing" rolls, with less wear of dressers, and are now free from cobweb checks on the face to face we were so much troubled with in our solid rolls.

SMITH, SUTTON & CO.

CRESCENT STEEL WORKS, Pittsburgh, April 11, 1878.

We have had several pairs of your Hollow Chill Rolls. One pair run until we dress all the chill off; the others are still in use and doing well.

MILLER, METCALF & PARKIN.

COSHOROCHEEN, Pa., April 11, 1878.

In reply to your favor of 6th, we have to say that the Hollow Rolls made by you, and on which we are now making Sheet Iron, are giving good satisfaction. We have no hot necks or "springing" rolls, with less wear of dressers, and are now free from cobweb checks on the face to face we were so much troubled with in our solid rolls.

J. WOOD & BROS.

Manufacturers Imitation Russian Sheet Iron, &c.

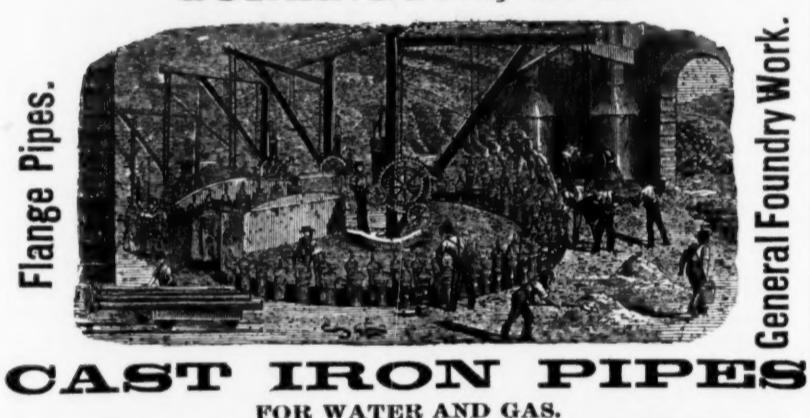
CATASAUQUA, Pa., April 11, 1878.

The Hollow Chilled Plate Rolls received from you last summer have given us entire satisfaction, and if we were in need of Plate Roll to-day, we would order another pair just like the last. When we need pair you will hear from us.

CATASAUQUA MFG. CO., OLIVER WILLIAMS, General Manager.

McNEALS & ARCHER,

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FOR WATER AND GAS.

Light Castings and Metal Patterns
A SPECIALTY.

TAYLOR & BOCCIS,
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CORRESPONDENCE SOLICITED.

Will make estimates on completed work when desired.

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T. F. HOWLAND, Sole Manufacturer Brooklyn, N. Y.

BUHRER'S
Infallible Sewer Gas Trap
A SURE AND EFFECTIVE SEAL
Against Sewer Gas.

The annexed cut represents the construction of this Trap, the essential feature of which is the Valve (D), made of pure rubber, the valve being a collar around it, which is fastened between the flanges (B) of the case and hangs loosely suspended from the top, thus securing the easy and rapid passage of waste and water through it, after which the sides of the valve come together and form a perfect and effective seal. The case (A) which contains the valve is made of cast iron, enameled on its inner surface, and is constructed so as to form a rest for the valve and facilitate its instant closing.

S. BUHRER, Inventor & Manufacturer,
Cleveland, O.

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Free from Slate and Sulphur.Machine-Made Brick, Limestone, Lumber and Shingles.
FARMS TO LET.

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Manufacturers of and Dealers in

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RAILWAY FREIGHT CARS, Car Wheels and Castings.

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Plain and Porcelain Lined Pumps.

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Pump Material in the rough or in the white. The very best quality

of work at lowest prices.

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A superior article delivered at low figures at any furnace within the district or at any point on the Ohio River. Refer to Roane Iron Co., Chattanooga Iron Co., or S. B. Lowe, Chattanooga.

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Dealer in Charcoal and Coke Pig Iron for Foundry, Forge or Car Wheel purposes.

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WITH WOOD OR IRON WHEELS.

A first-class article and a specialty, that will make a demand in any market and afford a good margin for dealers. We are prepared to furnish them in large quantities.

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ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 35 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

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Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

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This Hinge has two flat coil
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broad, solid bearings in the knuckle,
which do not wear down readily and
let the door sag. It is Fast Joint,
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than other Spring Hinges in common
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**The Lalance & Grosjean Manufacturing
Company.**

The manufacture of stamped ware from tin plate and black iron is an industry in which American mechanical skill and ingenuity have attained results vastly more perfect than have been reached in any part of the Old World. The success of our efforts in this direction are largely attributable to the fact that high wages and a comparative scarcity of skilled labor have compelled our manufacturers of sheet metal goods to employ machinery in every branch of the business, while the restless desire for improvement which has characterized our enterprising manufacturers has given us presses which for power, precision and perfection of operation, are better than any made abroad. These results have been reached within comparatively few years, and under the moderate protection afforded by the tariff our manufacturers have not only supplied the home market with better and cheaper goods than could be obtained abroad, but are manufacturing quite largely for export.

For the beginnings and, to a great extent, the development of this industry, the country is indebted to the energy and perseverance of Mr. F. Grosjean, president of the Lalance & Grosjean Manufacturing Company. The enormous and well appointed establishment of this company, with a capacity for manufacturing 6000 tons of sheet metal per year into useful forms, with little or no hand labor, has legitimately earned and long enjoyed a reputation for producing stamped ware of superior excellence and finish. During the Centennial M. Dietz, of the firm of Japy Frères, the well-known manufacturers of stamped ware in France, visited the works of the Lalance & Grosjean Manufacturing Company, at Woodhaven, Long Island, and admitted freely that some at least of the regular products of that establishment could not be made in any works in Europe. He was not only surprised at what he saw, but stated without reserve that many of the processes worked without difficulty in this country were regarded as mechanical impossibilities abroad. Certainly nothing of foreign manufacture shown at the Centennial compared with domestic products in this line, and we shall be surprised if the superiority of our stamped tinware is not acknowledged this year at Paris.

Like most of the establishments which have grown up with the progress of the past quarter of a century, the Lalance & Grosjean Manufacturing Company began in a small way. Mr. Grosjean sold in New York the goods forwarded from France by Mr. Lalance, and was the first to realize that it was possible to make such goods here as well as in Europe, and with a larger profit than could be realized from their importation. The business of manufacturing was begun in 1862 in a cellar on the corner of Hester and Elizabeth streets, New York. Six men were employed, and the results were so far satisfactory as to demand a steady increase in the capacity of the establishment. At first the business of the New York establishment was confined to the finishing and retinning of stamped goods imported from France, but one branch after another was added until a complete line of American stamped ware had been placed upon the market. In 1863 it was necessary to find more commodious quarters, and the business was removed to Woodhaven, Long Island, where a large factory was built. This was completely destroyed on the 21st of February, 1876, by a fire which began in the ignition of the grease in the tinning vats. All the machinery, dies and stock were destroyed, entailing great loss and inconvenience. Fortunately, however, a duplicate set of patterns and dies had been deposited in a fire-proof building. These were saved, and within three months the works were rebuilt and again put in operation, with brick walls, fire-proof roofs and entire security against a second conflagration. The works now cover an area of four acres and employ 450 hands. They contain eight presses and probably 200 other machines, driven by a Corliss engine of 150 horse-power. The work produced is of superior excellence, and every operation is conducted under the personal supervision of Mr. Grosjean, whose whole time is spent at the works superintending the mechanical processes.

The specialty of this company is the important line of goods known as agate ware. This ware is stamped from black iron and finished with a beautiful grayish mottled enamel, the tint varying with the composition from deep bluish gray to grayish pink. This enamel is applied in a semi-fluid condition, and perfectly vitrified by baking at a white heat. The enamel is quite elastic and adheres perfectly to the iron. Sharp blows with a hammer will chip it off in spots, but it does not star nor crack, and the removal of a flake at any point does not cause any other part of the enamel to peel off. The company have been making enameled ware in various colors, including white and blue, for 15 years, and have built up in this line an important business at home and abroad, greatly preferred abroad to foreign enamels. Among other specialties made by this firm are the "Favorite" bake and dripping pans, seamless and stamped without crimping; also stamped brass kettles of all sizes, which are given a superior finish by means of special machinery. Their deepest and heaviest stampings are made from one-eighth inch iron plates, pressed into thimble-shaped vessels of the extraordinary depth of 24 inches and a diameter of 16 inches, with nearly vertical sides, which are used as containing vessels for the carbonic acid employed in soda fountains. Most of the deep stamping at this establishment is done in black iron and subsequently tinned. The reason for this is that tin plate cannot be annealed, and in repeated stampings becomes brittle, whereas black iron can be revived by annealing, and when tinned is as tough and ductile as before manufacture.

There is one event in the history of the company which we think calls for something more than brief mention. When the manufacture of the marbleized ware, which became so widely and favorably known, had attained the proportions of an enormous business, and the ware itself was enjoying a wide popularity, a question was raised as to the safety of the ingredients

entering into the composition of the enamel. A rumor that it contained lead in soluble form quickly took the shape of specific charges that it was poisonous. Knowing that the only lead used was that which entered the enamel as flint glass, that by baking at high temperature the enamel was perfectly vitrified, and that experience gave them no warrant for the supposition that it was soluble, the officers of the company paid no attention to these damaging reports at first, regarding them as false statements prompted by malice. Finally the statement was made on the authority of a Boston chemist that the enamel contained lead in soluble form and was not perfectly safe as a lining for culinary utensils. The company then submitted the matter to competent chemists for thorough investigation, deciding to abide by their report at any cost. The result of repeated analyses showed that the lead in the enamel which entered it as flint glass, was soluble in certain acids and under certain conditions. There was, therefore, a possibility that it might do harm, though but little probability, as the enamel was apparently insoluble under any condition in water or in the weak vegetable acids developed in culinary operations. The officers of the company did not believe, nor do they now, that the enamel was any more liable to part with poisonous metallic salts than a glass tumbler, but analysis had shown that a bare possibility existed, and they gave the public the benefit of the doubt. The manufacture of the marbleized ware was at once stopped; urgent orders were left unfilled, and the trade was notified not only that no more would be offered for sale, but that all which had been sold would be redeemed. A business which it had taken years to build up was thus deliberately stopped and the company assumed an obligation, which we are sorry to say has been shamefully taken advantage of to return tons of marbleized ware worn out in service, and replace it with new agate ware. The course of the company in this matter is a conspicuous example of commercial honor. The marbleized ware was sold in good faith as free from any objection; the moment the company had reason to doubt that their warranty was warranted by the facts, before the public had learned that the purity of the enamel was questioned and while the trade were ready to take all they could make, they deliberately elected to stand the heavy losses which their decision entailed, and did so without complaint. Not until they had positive assurance that they had in the enamel of their present agate ware a composition which would stand not only the usage of the household but the most subtle and searching tests of the laboratory, was another piece made or sold.

American Machinery at Paris.—Edward King, writing to the Boston *Journal*, says: Our display of machinery is well chosen, but when we remember that the galleries devoted to machinery on each side of these colossal buildings on the Champ de Mars are considerably longer than Machinery Hall and the Main Building at Philadelphia put together, and that we occupy only an insignificant space—small by comparison with countries like Austria or Russia, countries which cannot supply one-tenth of the inventive ability possessed by the United States, it is a keen cause for regret. Our delay, our wretched, inexcusable delay, was the reason for this little and meager exhibit of our chief talent. We were compelled by a government who did not comprehend the importance of the exhibition to postpone everything until the very last minute, and the result will certainly be humiliating. The department of Italy—not far from ours—is to be regal in its splendor, and extends over two or three times as much space as ours. It certainly was a mistake to allow ourselves to be distanced by any country. We should have been greedy and taken every particle of space that we could get by applying at an early day.

Coal in Peru.—A bed of coal of unknown extent has been discovered at Chala Atla, near Oluzco, in the department of Libertad, Peru. The government sent a scientific commission to examine the deposit and has received a highly favorable report. The Chala Atla coal field will, it is estimated, suffice to supply the requirements of the whole of South America, and the quality and cheapness of the coal will enable it to drive the English coal from these markets. The average consumption of coal on the coast of Peru is estimated at 200,000,000 soles per annum, which, at the rate of 22 soles per ton, gives a total of 4,400,000 soles at present paid to England for fuel, and which Peru hopes to save by utilizing her newly-discovered sources of coal supply.

The Railway Age says: One of the most remarkable examples of engineering enterprise and boldness is found in the narrow-gauge extension, just completed, of the Colorado Central Road from Black Hawk to Central. The distance between these two places is one mile, but to accomplish it the road has to climb an elevation of 563 feet by a route 4½ miles in length. The undertaking was pronounced impracticable by many experienced engineers, but has been successfully accomplished by means of zigzagging switches, heavy rock cuts, some of them 50 feet deep, four bridges, numerous deep fills, one of 100 feet, and heavy masonry. The work, which is of the most substantial character, is said to have cost \$15,000 per mile, or about \$60,000. A standard gauge road over this route would have cost vastly more if it could have been built at all, which is doubtful—a very good illustration of some of the advantages of the narrow-gauge system for special localities.

Three hundred colored laborers leave the city of Washington this week for Brazil, to work for the Messrs. Collins on the railroad they are building, under the guarantee of the Brazilian and Bolivian governments. As the death-rate of the negro population of Washington is very large, these laborers may not find a change to the malarial regions near the equator of any particular disadvantage.

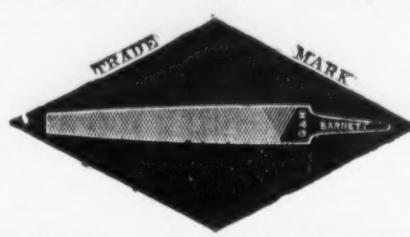


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ALL CUT BY HAND,



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Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
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Have Proved their Great Superiority.

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FILES & RASPS,
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Best Cast Steel.
HAND-CUT. Manufactured by
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Every File warranted.
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The "Economy" Molding Weather Strip is perfect in every respect. By enlarging edge of rubber or felt, and making slot in molding, it will not draw air, &c. It will last a lifetime, because rubber, etc., has only to be removed by taking old piece out of either end of molding, and fitting in a new piece. By this method of securing, the uncertainty of fastening or undoing a piece of tape or tacks is overcome.

Rubber supplied with enlarged edge and instructions to enable Car Manufacturers, Carpenters, Builders and for off trade to make slots in Sashes, Doors, Moldings, &c., and thus make perfect Weather Strips.



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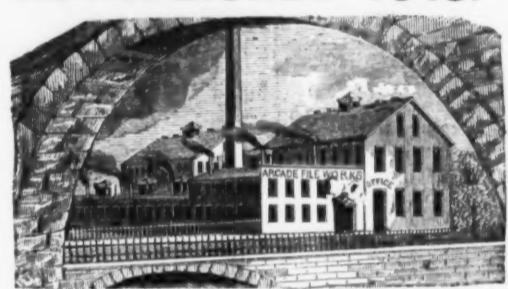
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AUSABLE HORSE NAILS
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HAMMERED AND FINISHED



The Ausable Nails
Are Hammered Hot,
And the Finishing and Pointing are
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Thus Imitating the Process of Making Nails by Hand.

Quality is **Fully Guaranteed.**

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House, Steamboat, Sta-
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BUCKETS.
Powder Kegs, Paint,
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PAILS.

Also Bar, Sheet and Tank Iron and Nails.

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200, 300, 400 lbs.
Capacity.
CORRECT,
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NOT LIABLE TO GET OUT
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Universally Approved
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Manufactured only by
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Manufacturers of

MEASURING TAPES.
Of Cotton Linen and Steel.
For all purposes for which Tape Measures are required.
Only manufacturer of
Paine's Patent U. S. Standard Steel
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FINE TEMPERED STEEL SPRINGS,
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From $\frac{1}{4}$ inch wide upward. Warranted tougher than
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Award and Medal for Self-Coiling Steel
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ORIGINAL INVENTORS AND SOLE
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Noiseless Self-Coiling Revolving
STEEL SHUTTERS,
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Scientific and Technical Notes.

A firm of shippers in Glasgow have patented a

HYDRAULIC CLEANER FOR SHIPS' BOTTOMS which is well spoken of. The apparatus consists of a small portable hydraulic machine and keel-catcher. On the machine is placed a rotating brush, which is put in motion by a turbine. A canvas hose connects the turbine with a hand or donkey pump. The keel-catcher will travel and retain its hold on any curved stem or straight keel by means of conically-shaped india-rubber rollers, which are moved either forward or aft by means of an endless rope from the deck. In commencing the operation the keel-catcher is adjusted to the stem of the vessel, above the water line, and lowered by the pulling of the endless rope. The machine, moved toward the keel by the rope passing through the keel-catcher, will, owing to the updrift buoyancy, press the revolving brush against the ship's side, whatever its shape, and clean it effectually. When the machine is felt to have reached the keel, the rope attached to its tail pulls it upward. After it has reached the water-line the operation is repeated, the keel-catcher and pulling ropes being shifted the length of the brush nearer the stern, so that a fresh strip of the hull is cleaned. The machine works up and down in this way, until it reaches the stern, and when one side of the vessel is cleaned the machine is attached to the other side and worked as before. The bottom of the Allan steamer Corinthian was cleaned in this way as she was coming up the river, and an inspection after she had reached the gearing dock showed that it had accomplished the object perfectly.

At a recent meeting of the Academy of Sciences in Washington, Prof. Alex. Agassiz gave an interesting description of

THE BOTTOM OF THE OCEAN in an account of the results reached by the Blake expedition, with which he was connected. He has passed over, for purposes of sounding and survey, a distance of 1800 miles in and adjoining the Gulf of Mexico. The work of observation was begun at the point where it had been left off by his predecessors in deep-sea dredging for that region—his father, Prof. Louis Agassiz, and Count Portales. They had, indeed, run one or two lines of dredging across the gulf, but it was done with the imperfect appliances of that day and brought no complete results. In depths exceeding 500 fathoms, for instance, Count Portales found little animal life, and at that time there was general belief that the limit of existence had been nearly reached at such depths. The following observations are reported by Prof. Agassiz: Where the depth is 1800 to 2000 fathoms inside the Windward Islands, the fauna corresponds to that of the Atlantic outside, the animals having doubtless penetrated through the openings between the islands. All classes of the animal kingdom found in the ocean are well represented. Inside the Caribbean Sea, the fauna is more socialized and characteristic. On the Challenger expedition it had been ascertained that the red clay ooze of the ocean bottom was largely the result of the decomposition of the shells of surface animals—a disintegrated portion of the limestone contained in those shells. Everywhere in the gulf a similar deposit was found. Pelagic animals, chiefly mollusks, may be said to fill this sea from the surface to 8, 10 or 25 fathoms in depth. There is no doubt that a stratum is forming at the bottom of the sea, due entirely to the coverings and hard parts of pelagic animals which exist in swarms near the surface. On the question as to the existence of many animals in deep water, near neither the surface nor the bottom, Prof. Agassiz is inclined to distrust the Challenger observations. The apparatus there used could not furnish proof as to the point whether the animals were really caught at the depth of 1000 fathoms or near the surface. Prof. Agassiz is not yet prepared to throw additional light on the question of sight by pelagic animals at great depths. The fact remains that at these depths there are found creatures of two classes in respect to vision: one eyeless, or nearly so, and with curious changes of structure taking the place sometimes that the eyes should occupy; others in a totally opposite condition, having eyes enormously developed, as if to enable them to see with the smallest modicum of light. This is true at depths of 1500 to 1900 fathoms or more, both as to crustaceans and fishes. It seems strange that the same conditions should have produced diametrically opposite results.

A novel process of
ANNEALING GLASS has been recently invented by Baron Albert and M. J. M. A. Weyer of Paris. It consists in burying the articles to be annealed in powdered stone, plaster, lime, fire-clay, &c., or in grease, oil, the melted nitrates of potash and soda—in fact, any liquid or solid capable of receiving the required heat and retaining in a condition suitable for the process. By this means glass articles are not only rendered more capable of sustaining sudden transitions of temperature, but they are also strengthened to a considerable degree. The method of imbedding the articles in powder renders it possible to anneal at a very high temperature, which is impossible unless some means are provided for supporting the articles and maintaining their shape when reduced to the softened state necessary to secure perfect annealing. By the new process the articles are filled with the powdered stone or other substance, and are then placed in crucibles and completely surrounded with the pulverized substance employed, being covered to a depth of at least 2 inches. The crucibles are then subjected to heat gradually increasing to 1472 F., or even to 1532 F., in a suitable oven for from four to six hours, and are then slowly cooled, the operation lasting for 24 hours when the articles are thick. Where there is little danger of spoiling the shape of the articles, the method of annealing by use of liquids gives similar results more rapidly and at less cost. In carrying out this process two boilers are employed, so placed that the liquid can be run from the upper into the lower. If nitrate of soda is employed the temperature will be over 500 F. before the

salt is melted, and the articles are then immersed in the cold state, and the temperature raised in that case to 1472 F., the highest degree possible with nitrate of soda. They are then allowed to cool slowly, and when the temperature approaches 500 F., or solidification point, the nitrate is run off into the lower boiler and a small fire is maintained beneath the upper boiler to prevent the too rapid cooling of the glass. By this means the articles are perfectly annealed without injury to the surface or the shape.

In a paper read before the French Academy of Sciences, M. Couste has ascribed the

DAILY OSCILLATIONS OF THE BAROMETER

to variations, first, in the quantity of aqueous vapor in the atmosphere, and second, in currents ascending vertically. The latter are formed partly by the dilated air, but chiefly by the evaporation of water by the sun in the low and middle layers of the atmosphere and its condensation anew in the upper layers.

Mr. Daubrée, the great French geologist, has attempted to prove recently that the

TRANSFORMATION OF ROCKS

may be produced by the heat which may be developed by mechanical action. He rotated rapidly a circular plate on a vertical axis, and applied to a small part of its surface near the circumference a small weighted and fixed marble plate, measuring the rise of the temperature of the latter with an alcohol thermometer. In one minute, with 445 revolutions, there was an increase of 4.5 C.

The mode of producing so-called

MUSLIN GLASS

is the following: After carefully cleaning the surface of a plate of glass, an even layer of vitrifiable color is laid over it, with the aid of gum water. The glass is then submitted to a gentle heat until the water has evaporated, when a stencil of the desired pattern is laid over the surface, and with a stiff brush the pigment is removed from the parts which are to be transparent. The glass is next inclosed in a frame, and above it is extended a piece of tulle, or, if desired, embroidered lace, the embroidery in the latter case being so disposed as to harmonize with the ground pattern previously made. The whole is then hermetically closed in a box which contains in its lower portion a reservoir holding a certain quantity of dry color in the form of an impalpable powder. This is blown evenly upon the glass by an air blast, adhering to it wherever the surface is not protected by the threads of lace. In this way the pattern of the latter is defined. In order to fix the powder the sheets of glass are exposed to steam, which moistens the gum and causes the powder to adhere. The color is then burnt in a special furnace.

The *Revue Industrielle* gives a description of a new

PNEUMATIC GRAIN ELEVATOR

constructed by Renhaye. It consists of a centrifugal ventilator, the suction pipe of which is carried to a receiver placed upon the level to which the grain is to be carried. From the same receiver the supply pipe runs to the place from where the grain is to be lifted. Between the openings of the suction and the supply pipe of the receiver is an inclined plane, which throws the grain downward. A screen prevents the grain from entering the suction pipe, through which only the dust is carried off. A piston regulator at the lower end of the supply pipe acts in such manner upon an adjustable nozzle that the proper proportion between the amounts of air and grain admitted is automatically maintained. The principle upon which this pneumatic elevator acts is that when solid particles in movement in a pipe are mixed with air, a semi-fluid is formed in which the pressures vary in accordance to the laws governing ordinary fluids.

The well-known inventor and manufacturer of nitro-glycerine and dynamite, Alfred Nobel, has added another explosive to the list, the

EXPLOSIVE "JELLY POWDER," so called from its resemblance to calf's foot jelly. It consists of 94 or 95 per cent. of nitro-glycerine and 5 or 6 per cent. collodion cotton, so mixed as to assume a gelatinous form. It is tough, but can be easily cut with knives or shears, and applied to cartridges or balls. It is water-proof, acts in the same way as dynamite, but is at least 50 per cent. stronger, and does not possess the great defect of the latter in parting with its nitro-glycerine when damp.

Dr. Wiesner has discovered in phloroglucin an extraordinarily delicate

TEST OF WOODY FIBER.

If a drop of a half per cent. solution of phloroglucin is placed upon a bit of pine, and the spot is moistened with a drop of hydrochloric acid, a beautiful red stain, verging upon violet, immediately appears. The slightest traces of woody substance in vegetable tissues can be readily detected in this manner. The tenderest germs, by means of this reaction, show a woodiness in the cells. Every trace of woody substance in hemp and flax can be detected by the phloroglucin. Dr. Wiesner suggests that it may be used to distinguish hemp from flax, and also as a means of dyeing fabrics woven from vegetable fibers.

The export trade in hardware increased during the first quarter of 1878 in Great Britain as well as in America, but we are making the greatest headway, comparatively, and our goods are gaining more popularity every day. Since Jan. 1 our shipments, as well as those of Great Britain, have advanced in the West Indies on account of an increased demand. Germany, Canada and the United States are importing more freely from England than heretofore. The Spanish West Indies, Argentine Republic, India and British North America are absorbing the increased trade of Great Britain, while the greatest decline of the exports of the latter is with Holland and Russia. It is difficult to make a fair comparison of our hardware exports with those of Great Britain, as her Board of Trade do not divide the returns into classes. England, however, is not falling off this year, and, in fact, did not show a large decrease in 1877—only 4 per cent. of value, which represents a reduction of price, not of quantity.

ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by

Ansonia Brass & Copper Co.
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ANSONIA
Bronzed Fire Screen,
With Ornamented Moldings.

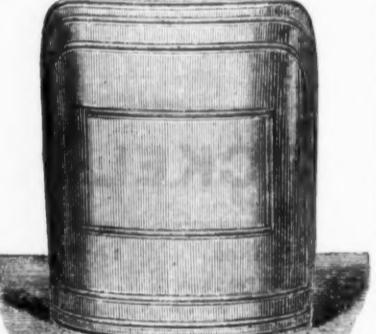
PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or

Shield, as shown in the illustration, is especially

designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat.

The frame of the screen is made of brass, the potential edges, curved in form to stand alone, it may be easily adjusted to any position about a stove, before a grate or fire place. The demand for something useful, durable and ornamental as a Fire Screen has long been felt, and having finally accomplished the desired result, we are prepared to fill all orders promptly.



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Eddy's Refined Lamp Black,
"Eagle" Axe, Pick and other Handles,
"Cortland" and "Wadsworth" and Emery Papers,
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Tackle Blocks, Spokes, &c., &c.

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Paper Drawing Scales, Willis' Odontographs, Steel Straight Edges,
and T Square Blades.

MEDALS AWARDED: Paris Exposition, 1867; Vienna Exposition, 1873; Philadelphia, 1876.
Illustrated Catalogue sent per mail on application.

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No. 4, \$0.84	No. 8, \$1.40	No. 10, \$1.65	No. 11, \$1.85	No. 11, \$1.94	No. 11, \$2.10	No. 10, \$2.15	No. 7, \$2.15	No. 9, \$2.40	No. 10, \$2.85	No. 10, \$3.45	No. 14, \$4.60
5, 0.93	9, 1.55	11, 1.82	12, 2.00	12, 2.10	12, 2.25	11, 2.38	8, 2.20	10, 2.50	11, 3.00	11, 3.55	16, 5.40
6, 1.07	10, 1.63	12, 1.95	13, 2.35	13, 2.45	13, 2.60	12, 2.50	9, 2.30	11, 2.70	12, 3.25	12, 3.65	18, 6.55
7, 1.20	11, 1.80	13, 2.30	14, 2.50	14, 2.70	14, 2.80	13, 2.85	10, 2.40	12, 3.00	13, 3.75	13, 4.00	20, 8.15
8, 1.35	12, 1.90	14, 2.45	15, 2.75	15, 2.95	15, 3.24	14, 3.15	11, 2.55	13, 3.45	14, 4.00	14, 4.25	
9, 1.50				16, 3.10	16, 3.35	16, 3.68	15, 3.50	12, 2.80	14, 3.75	15, 4.30	15, 4.75
10, 1.60	$\frac{3}{4}$ INCH.	$\frac{7}{8}$ INCH.	1 INCH.		17, 4.00	16, 3.90	13, 3.12	15, 4.05	16, 4.80	16, 5.10	No. 14, 5.00
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$\frac{5}{8}$ INCH.	5, 1.04	6, 1.21	7, 1.34	7, 1.40	7, 1.55	$1\frac{1}{2}$ INCH.	18, 4.80	15, 3.80	17, 5.00	18, 5.70	18, 6.10
No. 4, .88	6, 1.16	7, 1.34	8, 1.47	8, 1.53	8, 1.65	No. 7, 1.88	20, 5.85	16, 4.10	18, 5.40	20, 6.75	20, 7.30
5, .98	7, 1.30	8, 1.47	9, 1.61	9, 1.68	9, 1.80	8, 1.94		17, 4.60	20, 6.50		20, 9.15
6, 1.13	8, 1.44	9, 1.61	10, 1.75	10, 1.95	10, 2.05			18, 5.10			
7, 1.25	9, 1.57	10, 1.69						20, 6.05			

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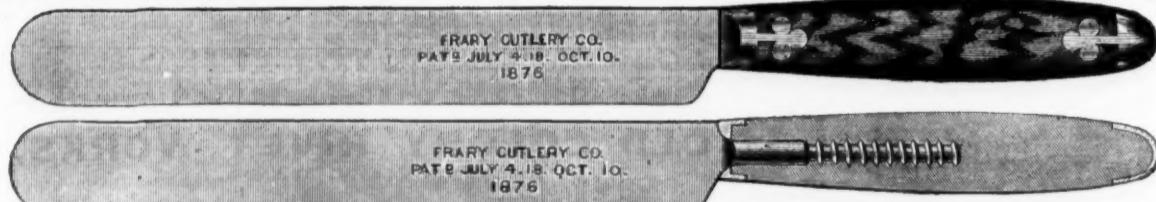
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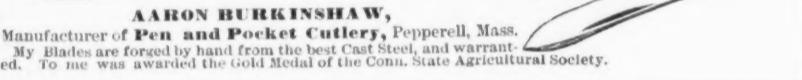
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Rapid Transit in Brooklyn.—So much has been said of late respecting various schemes for rapid transit in Brooklyn, that our reporter called upon Mr. Felix Campbell, President of the Board of Transit Commissioners in that city, who remarked that of the whole number only one or two have any substantial backing. The rest emanate from engineers seeking notoriety. The Steam Transit Company, which broke ground on Saturday near the Fulton ferry, is not acting in conjunction with the commissioners, but under their charter, such as it is. The latter requires that one mile of road be built before July 1st, but as this feat can hardly be executed within so brief a time, it is surmised in some quarters that the "start" is made with the hope that they will be enjoined from proceeding further, or possibly with the intention of enjoining themselves, and thus perpetuating their chartered rights. However this may be, the question of rapid transit in the "city of churches" remains all in a smudge, with no very cheering prospects for lack of ready money.

Canada Steel Co.—We learn that the business of this company is increasing so fast that they propose to double the capacity of the present works. Another fine engine from the Baldwin Locomotive Works has been added, which now makes the fourth in use at the works—two of the 3-foot gauge and two of the 4-feet 8½-inches gauge. We are informed that last month this company paid no less than \$8000 freight to the Intercolonial Railway department. About two car loads of manufactured iron are daily dispatched from Londonderry station, and large quantities of coal from Picton and limestone from Brookfield are received.—*Maritime Sentinel*.

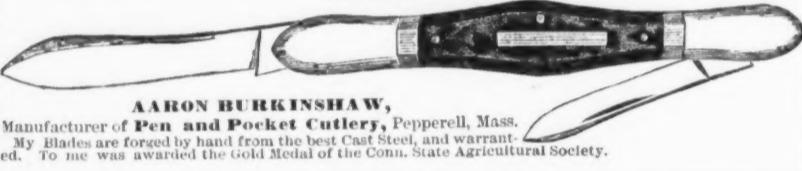
* The Norwegian coin is the same as the Danish, The pound is equal to 1.103 pounds American.

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POCKET KNIVESThe assortment of Gardner's Celebrated
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are now furnished with Rubber, Bone, Stag
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Aaron Burkinshaw,
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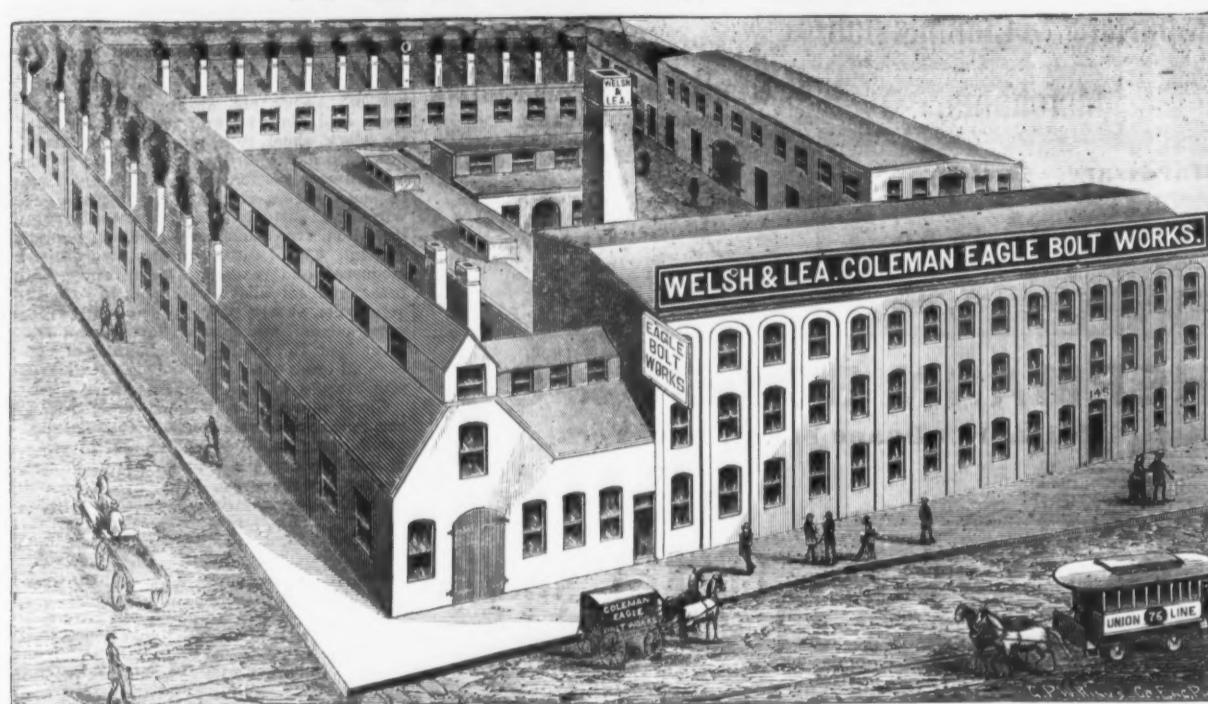
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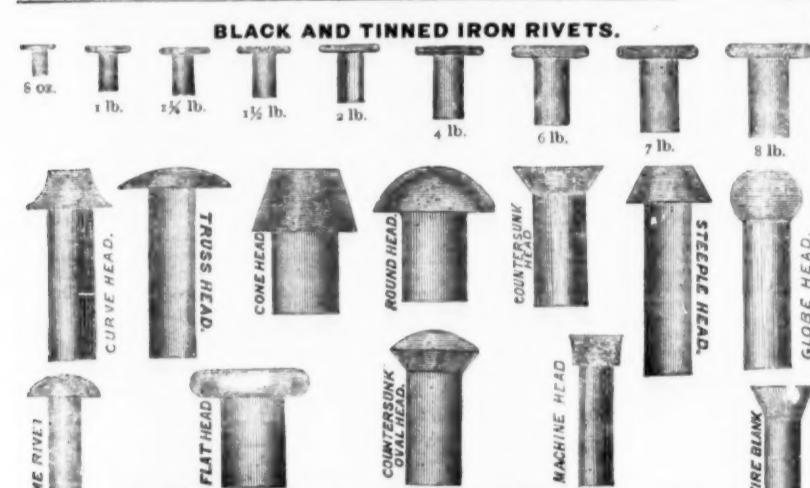
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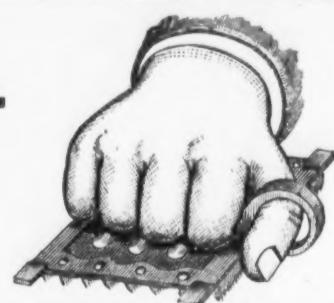
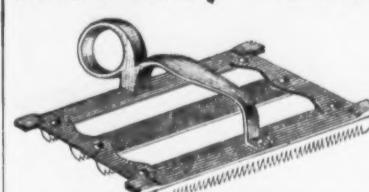
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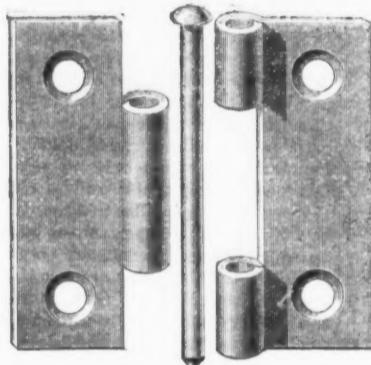
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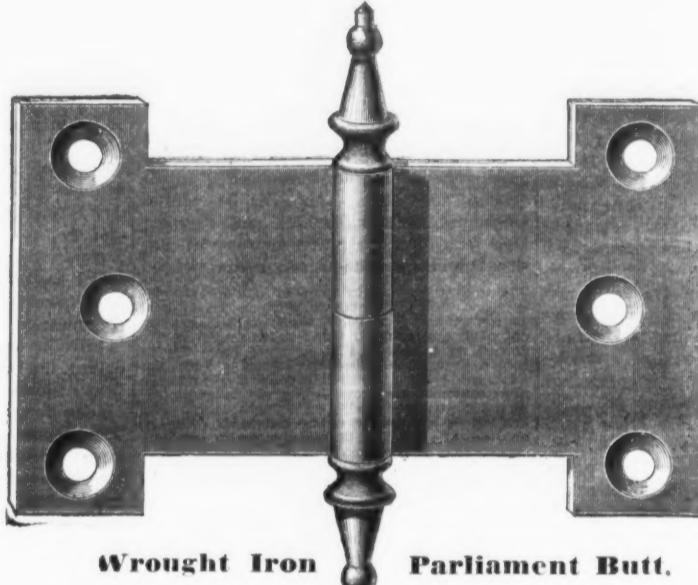
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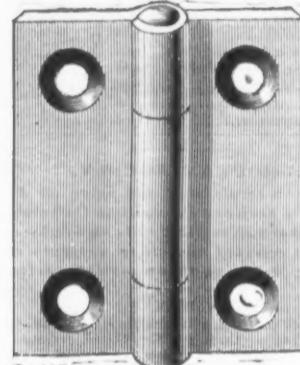
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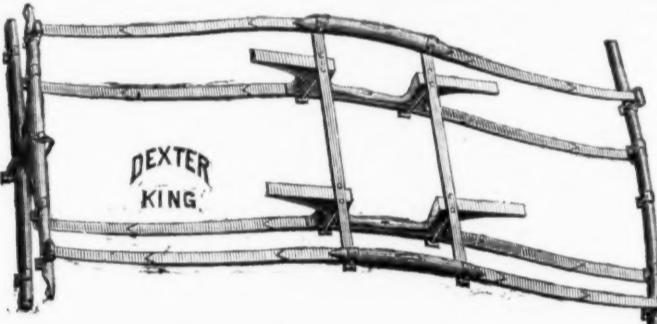
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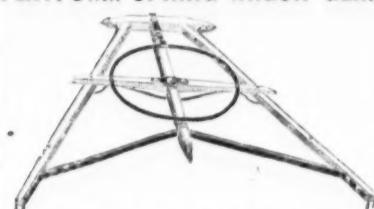
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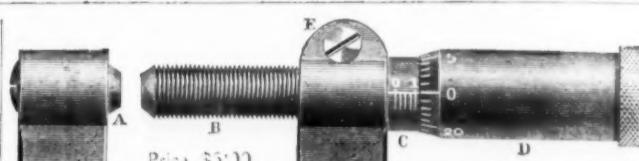
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The American Hardware Company, Melbourne, are agents for Australia. Sample copies will be mailed by them, free of charge, to any firm engaged in the trades we represent in Australia, Tasmania and New Zealand.

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Our English friends are likely to suffer more than we shall from the adoption by Russia of a protective policy. The Russian Minister of Finance has prepared for the consideration of the Imperial Council a project for increasing the duties upon all iron and steel goods in bar or ingot, or manufactured into rails, locomotives or carriage fittings, entering Russia from abroad. The

duty upon rails will be about \$7.30 per ton; upon bar iron, \$12.65, and sheet iron, \$18.25. We do not understand that the proposed tariff has yet been adopted, but it is probable that the rates of duty fixed upon will be satisfactory to Russian manufacturers.

The Proposed Auction Sale of Wood Screws.

In our trade report this week, under the heading "General Hardware," will be found an interesting item of news to the effect that the American Screw Company have in contemplation the experiment of a sale by auction of a large lot of wood screws, with a view to relieving themselves and the market of an accumulated stock which has become inconveniently large. The announcement is not made positively, and it seems to be evident that in authorizing its publication in *The Iron Age* the company desire to call out the views of the trade for their own information and guidance.

To discuss such a proposition editorially is at once delicate and difficult, inasmuch as nothing within our knowledge in the past history of the trade enables us to foretell the probable issue of the experiment. Selling by auction is, at best, an abnormal method of effecting exchanges between seller and buyer. In certain lines of trade it has become an established custom, for reasons which do not exist in the hardware trade, and probably never will. In the dry goods trade, for example, the auction-room is used as a means of forcing off goods when, from any cause, the demands of trade are not sufficient to consume stocks in manufacturers' or agents' hands. The dry goods trade is peculiarly a trade of seasons. Stocks manufactured for sale at a given period of the year must be disposed of promptly or carried over. They are, moreover, a class of merchandise in which consumption is largely influenced by price. If the manufacturer or agent can close out at auction a line of goods which must otherwise be carried over, he can usually afford to let them go at prices much below the market quotations, as he saves interest, storage, insurance and the risks of carrying a stock over from one season to another. The buyer, on the other hand, is encouraged to buy by the opportunity of purchasing at his own valuation a line of goods which will always sell at retail when offered cheap enough. Sometimes, when a speculative spirit is developed among buyers, the prices obtained are as good as those which the goods would have commanded at private sale, but even then they are seldom profitable to the seller.

With imported goods the case is somewhat different. Some lines of foreign manufactures are imported almost wholly for the auction room, and as the importations usually bear a close relation to the probable wants of the market, there is competition enough among buyers to keep prices up to figures which leave the importers a profit. In the case of teas, india-rubber, &c., the requirements of consumption are imperative and the available supply accurately known. When a cargo arrives it may safely be put up at auction, unless the market happens to be overstocked at the moment. In these lines the trade deals with known quantities, and the lower prices obtained in the auction room are usually compensated by quick returns.

Outside of the dry goods trade the auction business in domestic manufactures is limited in amount, and the goods sold are mostly those made for the auction room, collections from bankrupts' stocks, defective or damaged wares, &c. Sometimes they bring their value, and occasionally more, but usually they are "knocked down" cheap.

We have neither time nor space this week for an extended discussion of the subject under consideration, but from the preceding general remarks it will be seen that the success of a sale of goods by auction depends very much upon circumstances. In the case of screws the circumstances do not seem to us to favor active bidding or satisfactory prices. In the first place screws are not reasonable goods, and consumption is not likely to be stimulated by cheapness. The companies engaged in the business have an extensive plant in perfect operation, and a capacity so great that any demands of the market could be more than met at short notice. The market would not, therefore, be relieved to any beneficial extent, so far as dealers are concerned, by a forced sale of all the stock in manufacturers' hands, inasmuch as current production would suffice to maintain an over-supply. To attract buyers to an auction under such circumstances, the company would have to announce the amount of their offering and state the conditions, which would have to be the sale without reserve of all the goods put up. Buyers would probably be willing to speculate if they could get screws enough below the cost of manufacture to give assurance that the makers would be unwilling to sell any more at the same prices, but we have no idea that the American Screw Company are prepared to sacrifice their stock merely for the sake of getting rid of it.

These are, at most, hasty generalizations from data insufficient to justify a positive opinion, but the views we have expressed seem to be warranted by such information as we have. We should be glad to know the opinions of the trade with regard to the expediency of the venture. Thus enlightened, we may consider the subject further in another issue.

Condition of the Manufacturing Industries of Europe.

Recent advices from Great Britain clearly show that whatever the real or supposed advantages which British manufacturers have gained in past years from free trade—and consequent low wages to labor—their system has proved no safeguard against the paralyzing influence of general stagnation. At the present moment our manufacturers are probably better off, generally speaking, than those of Great Britain, and with much better prospects of early revival and continued development. The immense cotton industry of Lancashire is brought to a standstill by a strike of the operatives against a further reduction of wages which left them the choice between starving in idleness and starving on the meager fruits of industry. The great woolen manufacturing industries of England are also much depressed, although in some lines a slight improvement is noted. In the coal and iron trades the situation is desperate and the outlook dark. Prices of pig iron continue to decline, and no one has ventured to say when bottom would be reached. There, as here, the market is overstocked, and as makers are compelled to realize, buyers are not inclined to purchase beyond immediate requirements. A greater activity in shipbuilding has caused an improvement in the demand for plates. The steel business is very quiet, and the Sheffield and Birmingham industries are much depressed. The situation is thus summarized in *Iron*:

It was anticipated by a few of our correspondents last week that prices were in the highest degree unlikely to exceed those of 1864, the present near approach to those rates being regarded as a hopeful sign. But we have now to record that in the Sheffield district at least, the memorable low figures of 14 years ago are once more touched, and worse seems to be expected. At the same time it must be borne in mind that low prices are chiefly connected with ordinary qualities of iron, and the superior qualities appear to command good prices even at times of depression. The special steel for tools and similar high-class uses are cases in point as far as Sheffield is concerned, while the first-rate brands of boiler plate peculiar to West Yorkshire afford another illustration. Indeed, as reported from this latter district that large government orders have been offered at prices based upon the present depression, it may be revised, on account of the determination to have a good price for a good article, which is unanomous among the makers. These cases are, however, exceptional, and the bulk of our reports still speak of nothing but dull trade. Quotations are coming to be quite nominal on many exchanges, and but little business is done, although prices asked and offered only differ by 3d. and 4d. per ton. Buyers will not or cannot raise their offers and sellers dare not name their terms—openly, at any rate, though we hear of underselling at more than one large center. The West Coast keeps up its quotations, but prices are somewhat weaker. This district shares with Cleveland the good fortune of being able to improve its steel-making plant, so as to be ready for better times when they come. Lancashire, like other districts, is simply going a hand-to-mouth trade. North country iron is still offered at prices local brands, but little business is done in them, although the competition affects prices. Of Staffordshire much the same may be said. The iron trade is, as usual, a little brisker than that in pig, being confined, however, to home demands, though these are becoming somewhat modified by the foreign business consequent upon the crisis in the cotton trade. Hard iron and ironmongery are not in very great demand, in spite of the diminution in stocks reported by travelers all over the country. Government purchasers seem to have exhausted stocks of many articles which will have to be made up. The coal market sympathizes with the iron market, and dullness is its main characteristic.

French and Belgian advices are to the same general effect. In France it is believed that any change which may occur will be in the direction of improvement. The only activity reported is in fine irons for carriage builders' and tool makers' use. General business is dull, and nearly all the important manufacturing industries of the country are struggling against adverse conditions and low prices.

Considerable benefit is expected from the Exhibition, but it will not be felt immediately. The Belgian iron industry, though suffering from the unusual depression, seems to be in a very healthy condition. It is stated that not one failure in the iron business has occurred in Belgium during the past three years. Wages have suffered a serious decline, but the workingmen have accepted the situation and strikes are almost unknown. If we derive no other satisfaction from such a hasty glance at the situation than the assurance that we are no worse off than our neighbors, it is a comfortable knowledge that will better enable us to bear the ills we suffer.

Elsewhere in this issue we give abstracts of two of the valuable consular reports which have been called out by the intelligent and well-directed efforts of Mr. Evarts and Mr. Seward to make our consular service immediately and practically beneficial to commerce, and especially to those who are engaged in the effort to build up our export trade. The most important of these is from Mr. J. R. Weaver, our Consul at Antwerp, Belgium. Read in connection with our editorial entitled "American Interests in the North of Europe," published March 28, and another entitled "The Commercial Development of Belgium," published May 9, it will be found to give our manufacturers a great deal of exact statistical and general information concerning that country and its markets. It will be noticed that Mr. Weaver's report exactly confirms the views we expressed in our editorial on the needs and demands of Belgian consumers. He states very clearly and correctly that not our wants but theirs must direct the efforts of the American manufacturers. Mr. Weaver also urges the importance of honesty in every detail of manufacture. The people of the Continent are tired of goods in which cheapness is secured at the expense of quality, and what they buy must be good as well as cheap. What he says about resident agents, special depots or show rooms and traveling salesmen, merits careful

consideration. In fact, Mr. Weaver's report is a model official document, and is one of the best we have had the pleasure of printing. The other abstract to which we refer is on our trade with Central and South America, by Mr. Williamson. Interesting extracts are also given from letters by Col. T. W. Knox, written from the East Indies.

The National Association of Stove Manufacturers.

The semi-annual meeting of the National Association of Stove Manufacturers is announced to be held at the Kennard House, Cleveland, Ohio, beginning Wednesday, June 10, at 11 o'clock a.m.

The peculiar state of the stove trade and the strong feeling growing out of the discussion of some questions which have a present interest for manufacturers altogether disproportionate to their economic importance, promise an unusually interesting meeting, and will probably attract a considerable attendance. Strong in numbers and in influence, the association is capable of exercising a power which, if properly directed, can be made largely and permanently beneficial to the whole trade. It is, however, no courtesy to the management or the members to say that the interest and value of its deliberations would be very much increased if some order of business could be agreed upon in advance. The first day is usually consumed in purposeless talk, and the second day's business is often interfered with by a vast amount of discussion which has no specific object, and which commonly drifts from one subject into another. No one seems to know, when the association is called to order, what is to be done beyond calling the roll and listening to the president's address. This is commonly followed by desultory talk, motions and resolutions. The second day's session is usually much longer and more interesting than the first, but if, as at the last meeting in New York, one interesting subject is raised, it is likely to monopolize the discussion. In their social features the meetings are delightful, and these semi-annual gatherings of the trade cannot fail to be attended with great benefit to all who take part in them; but in criticising the sessions at business meetings, we believe we express the opinions of a majority of the officers and members. Considering the present condition of trade, it is important that the association should put itself squarely on record on a great many subjects; and while it is neither our duty nor our privilege to make suggestions as to the order of business, we hope, for the sake of the great material interests represented by the association, that the gentlemen upon whom that duty devolves will appreciate the importance of giving it early and careful attention. The mistake of providing too much business is, of course, as great as that of providing none at all, but with several years' experience to guide them, the executive committee should, we think, have no difficulty in striking the happy medium between nothing and too much.

The Treasury Decision in the Case of Siemens-Martin Metal.

The following is the text of the decision of the Secretary of the Treasury respecting the classification of Siemens-Martin steel for appraisement by customs officers:

TREASURY DEPARTMENT,
WASHINGTON, D. C., May 27, 1878.—
Collector of Customs, Boston, Mass.: Sir.—The Department, by decision of December 1, 1874 (Synopsis 205), held that metal produced by what is known as the "Martin-Siemens process" should be charged with the same rate of duty as steel, such process having been considered a steel-making process, designed only to produce an article having the "quality of steel." Subsequently, upon further consideration, and upon additional facts at that time submitted, the Department, by letter of July 14, 1876 (Synopsis 289), expressed its conviction that both iron and steel are produced by the Martin-Siemens process, and that consequently the fact of manufacture is not of itself a sufficient ground for classifying the product as steel, but that the question whether any particular importation was iron or steel was one of fact to be determined by the appraisers.

It has recently been ascertained that a want of uniformity has prevailed at the ports of New York and Boston in the classification, since the later decision of importation of metal produced by the Martin-Siemens process. The Department, after a full examination and consideration of all the facts and information bearing upon the question, has decided that the classification of iron as steel, and of steel as iron, is erroneous, and that all metal produced by that process should be hereafter classified as steel, and assessed with duty accordingly.

"compete with them in their own markets. Many of us, I think, make the mistake of believing that our own ways are the best ways and must find popular acceptance everywhere. A persistence in this delusion will simply result in many cases in excluding from foreign markets the goods of the manufacturers who adhere to it. The key to success in the foreign trade, as I understand it, is to study the requirements of the market you seek to fill, and then endeavor to meet those requirements more perfectly than is done by the manufacturers who already occupy that market." This is sound, practical sense, and we are glad to see that so many of our manufacturers are taking this broad and correct view of the situation. It is sheer folly to suppose that we can force upon foreign consumers anything they do not want. There are usually good reasons for the differences which exist in the habits of two nations, and the reasons must be studied in the case of a people whose wants we propose to supply. The best preparation a manufacturer can have for a successful venture in the exporting line, is a journey over as much of the world as he can spare time to visit.

The returning prosperity of the railroad companies, resulting from large crops and an increase in the volume of internal trade, cannot fail to favorably affect other interests in a marked degree. During the past few years the companies have been compelled to exercise a close economy of expenditure, and are now in a condition to require liberal supplies of materials for repairs and equipment. We cannot expect any sudden revival from this cause, but the prospects of an improvement in general trade are made brighter thereby. It is probable that for some years to come the management of our railways will be characterized by a judicious conservatism. We shall have less of reckless extension and greedy absorption, and companies with paying lines will be much less ready to saddle themselves with burdensome responsibilities for the sake of a remote future advantage. As the result the companies will be in a better position to consume the products of our great national industries, and their increasing orders are already having a good effect upon trade.

It is stated on what seems to be as good authority as we usually have for foreign news, that the German government has promulgated a secret but general order requiring that all materials consumed in government establishments shall be of German production, including, of course, steel, iron, tools, files, machinery, fuel, &c. We question the wisdom of such an order, but if it has been issued we see no reason why it should be kept secret. The principle of consuming domestic products for government uses is a good one, but when made an absolute requirement it may at times place the government at a disadvantage.

Those who are foolish enough to hope for war between England and Russia are likely to be disappointed. The outlook grows more and more pacific, and there is little reason to fear an unsatisfactory issue of the deliberations of the international Congress. War cannot be anything but a terrible calamity, entailing far-reaching and incalculable evils, and we heartily congratulate the English people upon the prospects of escaping a struggle in which success would be scarcely less deplorable in its consequences than failure.

New Publications.

THE COAL TRADE, 1878. By Frederick E. Seward, Editor of the *Coal Trade Journal*. Price, \$1.

The work before us is the fifth annual review of the coal trade, published by the able editor of the *Coal Trade Journal*. It is chiefly a compilation of data concerning the production of the various countries of the globe and of the various coal districts of the United States and Canada, the figures in many cases covering a long period of years. They are particularly valuable in the case of the various anthracite and bituminous coal regions of Pennsylvania, which State naturally occupies the greatest share of the author's attention. Brief historical and descriptive notes, aided in many cases by maps, enable the reader to form an approximate estimate of the extent of the various coal fields, their position to highways of travel and to the great markets. As far as possible the author illustrates the nature of the material mined by analyses. Another feature deserving the careful attention of those who consult Mr. Seward's work are the receipts and shipments of some of the principal markets of the United States, for instance, Buffalo, San Francisco, New Orleans, Providence, Boston, Cincinnati, Chicago, St. Louis, &c.

The coal deposits of a number of States—of Colorado, Indiana, West Virginia, Missouri, Ohio, Tennessee, &c., are described and discussed in a series of short papers which, as summaries, are excellent and cannot fail to meet with appreciation. We cheerfully recommend Mr. Seward's book to the large circle of our readers who require a reliable work of reference.

The National Association of Stove Manufacturers.

BUFFALO, JUNE 1, 1878.
The semi-annual meeting of this association will be held in Cleveland, Ohio, on Wednesday morning, June 19, at 11 o'clock. The Kennard House has been selected as headquarters for the association. The rates are as follows:

Rooms in second story, \$3 a day. Above that \$2 and \$2.50, according to location. This is a reduction from current rates.

Respectfully,
SHERMAN S. JEWETT, President.

THE WOOD TARIFF BILL.

Its Defeat Yesterday.

WASHINGTON, June 5.—Mr. Wood's labors in behalf of his Tariff Bill were brought to a sudden close to-day. The enacting clause was stricken out of the bill by a vote of 134 to 120. This killed the bill.

Large Iron Contracts.

The most important contract in the iron business for several months has just been closed between the New York Elevated Railway Company and two manufacturing firms for the construction of three miles of double-track railway, to which some reference was made last week in our Philadelphia correspondence. This particular job calls for 7000 tons of iron, and is given to Mr. A. R. Whitney, late A. R. Whitney & Bro., and to the Passaic Rolling Mills. This will complete the route between Sixty-first street and One Hundred and Twenty-ninth street, or Harlem River. The work is equally divided, Mr. Whitney taking the upper section, and the Passaic Rolling Mills the lower section. The competition is understood to have been quite sharp.

The proposed depot building for the New York Elevated Railway, for which Mr. Whitney has also secured the contract, will be an immense structure, entirely of iron and covering the area bounded by Ninety-eighth and Ninety-ninth streets, Third and Fourth avenues, which is equivalent to two entire ordinary city blocks. The plan of construction has not yet been finished, but it is determined to run the cars out and in over iron columns at the same elevation as the track. There will be at least 1000 feet of track within the building to facilitate the handling of rolling stock.

Mr. Whitney has just taken the contract to build the roof for the Seventh Regiment drill room, now in progress on Sixty-seventh and sixty-eighth streets, Lexington and Fourth avenues. This room will permit the evolution of a large body of troops, the entire span being 300 by 200 feet in the clear. This large unbroken floor space has rarely been exceeded or equalled save in depot buildings. Of the two plans submitted for examination, one was a pin-connection and the other was riveted. The latter was finally adopted. The style of construction will correspond almost exactly with the roof of the Grand Central Depot, put up by the same builders. Mr. Whitney employs about 1000 men and turns out 100 tons of finished work per day.

Consular Reports.—American Trade with Belgium.

Mr. James R. Weaver, United States Consul at Antwerp, communicates the following to the Department of State under date of May 1, 1878:

On account of the great facilities afforded by the various direct steamship lines, which for several years have been plying regularly between this port and the United States, Antwerp and the surrounding country, as well as the entire kingdom of Belgium, have become so familiarized with our American products, and to such a considerable extent with our manufactures, that at first view it appeared doubtful if any very great development in these imports, especially of the products of our country, could be profitably made.

Consequently the frequent response made to any inquiries in reference thereto by the most intelligent and enterprising merchants of this city, was to the effect that the people of the United States are doing wonderfully well in their export trade to Antwerp, and that they could hardly expect to augment their shipments to this port to any considerable degree. And when it is stated that the general imports from the United States to this port amount annually to over 125,000,000 francs value, or to over 11 per cent. of the total imports, the justness of the above expression of opinion becomes more apparent.

It may be further stated that the commercial intercourse of the United States with Antwerp is second in importance to only one of all the nations of the world. And could the origin of the imports from England to Antwerp be accurately ascertained, there is no doubt but that the percentage of our trade would be largely increased and found to be relatively in the most flourishing condition of all the great commercial nations trading with this port.

From the several recent annual commercial reports forwarded to the department from this consulate, it may be observed that with but few exceptions the chief productions of the United States stand prominently among the imports of this port. Having overcome every prejudice, and being now in the hands of substantial parties, they have created such a demand and reputation for themselves that a permanent position is without doubt secured for the future. Certain articles have become a necessity to the prosperity and well-being of the people of this country, while a failure in the supply of such articles as petroleum, wheat, meat, cotton and tobacco would revolutionize prices. Among these principal articles of the production of the United States, imported in such large quantities and known so favorably upon this market, may be mentioned the following: Wheat, flour, petroleum, oils, resin, turpentine, salt, pork, bacon, hams, lard, tallow, tobacco, dyewoods, copper, drugs, honey, minerals and clays, canned fruits, fish, meats and vegetables, cotton, lumber, and recently, fresh oysters. I should observe that each of the foregoing articles is well introduced upon this market, and in order to sustain them in good position it will only be necessary for our shippers to be careful in respect to the quality of the articles shipped, the manner of packing, and the parties to whom they consign; for each and every malcontent between the parties interested works harm and excites a prejudice against the trade. Besides, the distance is so great, the time required to rectify mistakes or settle disputes so considerable, and recourse to law so difficult and expensive, that the utmost care should

be given to all minutiae, and every precaution taken to place first-class articles in first-class condition in the hands of capable, honest and honorable parties, to the end that every dissatisfaction as far as possible may be avoided. It should be remarked, however, that with a little enterprise on the part of shipowners, merchants and capitalists, and the co-operation of the authorities and commercial houses of the several ports interested, the direct importation of many of the articles mentioned above might be materially increased; for example, the quantity of cotton imported directly from the United States to Antwerp, instead of increasing, as it should, is constantly decreasing. The principal cause of this is the absence of direct steam communication to the cotton ports. Frequent projects have been considered recently to establish such a line, but as yet no success has attended these efforts. Another reason for the decline of the cotton trade at this port is undoubtedly the abuse which the direct shipments received during the Franco-German war, when, partly through unavoidable circumstances and partly through the culpable neglect of consignees or other agents, thousands of bales lay exposed for months, unprotected from the elements and petty thieves, until the loss was frightful. The mistake was realized when too late, but if direct steam communication could be established with one of the principal Southern ports, there is great reason to believe that it would enormously increase the shipment of cotton and other products of those States to this port. Could such a line be guaranteed actual expenses by any railroad or combination of them, there are plenty of houses in this city willing to undertake its establishment.

The lumber trade likewise might be increased profitably if certain abuses could be removed and port regulations modified. The great complaint is the delay attending the discharge of cargoes in this port. The expense and delays at present conducted eat up what might be otherwise a living freight. But as these delays and expenses are brought about by lack of means to handle such cargoes, as well as the deep rooted habits and customs of people and the port, no serious improvement can be hoped for very soon.

No attempt as yet has been made to import to Antwerp fresh meat, butter and eggs, but the prices of these articles on this market would apparently warrant an experiment to be made in that direction. The Red Star Line is now employed in constructing two additional vessels for what must be eventually a weekly service. This line and the White Cross have during the past season imported each voyage from one to three hundred barrels of oysters to Antwerp, which gave general satisfaction, although some objections were expressed in reference to their taste and appearance, and a portion of these lots was condemned as unfit for use by inspectors appointed for the purpose. It is believed, however, that upon further acquaintance they will improve and overcome prejudices, as several other American products have heretofore done. The small quantity of Indian corn imported to this country is surprising. Neither man, animal nor fowl appears to appreciate it as an article of food. If some means could be suggested to teach the Continent how to prepare this healthful and excellent article of food, the consumption would be without limit.

But while the productions of the United States, comprising principally the raw materials, hold such prominent positions in the imports of this port, our manufactures are imported in very limited quantities. For several years the imports of leather have averaged about 5,000,000 francs annually, but this is about the only manufactured article imported in considerable quantities, a large part of which arrives in transit for the interior of the Continent.

But several other articles are found in small quantities upon the market, the result of many efforts put forth during the last decade or two. But all such efforts have been made in only a half-hearted way, without inspiring confidence or doing the article justice.

Recently greater energy and tact have been displayed, and it is to be very earnestly hoped that this business may finally drift into the hands of solid, reliable parties.

The people of the United States enjoy certainly a very enviable reputation for ingenuity and invention, particularly in reference to the construction of practical, useful machinery. Consequently, we find among the imports to the United States to Antwerp, American pumps, sewing machines, fire-engines, agricultural machinery, household utensils, garden tools of all descriptions, mechanical toys, &c. There may be seen also stoves, safes, locks, general hardware and cutlery. We find, in small quantities, plain glassware, cotton fabrics, and wooden manufactured articles, as well as various ingenious contrivances of a well-regulated household, from the rolling pin and smoothing-iron to an elaborate sewing machine and musical instrument, all fair specimens of our industrial and mechanical skill.

In addition to the foregoing articles I might enumerate several others that as yet are not upon this market, but that might be profitably introduced with a little effort and judgment, viz., machine-made horse shoes and nails, school furniture, carriages or parts thereof, such as hubs, spokes, felloes, &c.; machine-made splints, gutta-percha harness mountings, wooden boot-trees, shoe lasts and certain qualities of patent leather; also, possibly, train cars and railroad carriages. Should we, therefore, classify the foregoing articles into three categories, and have others more in detail, we have as follows:

Class I.—Products and manufactures of the United States at present generally introduced upon this market and favorably received, but not likely to be greatly developed, comprising wheat, flour, petroleum, resin, turpentine, bacon, hams, lard, tallow, tobacco, drugs, copper, minerals, clays, canned fruits, corn, fish, meats and vegetables, dyewoods, leather, pumps, sewing machines and electrotype silver-plated ware.

Class II.—Products and manufactures partially introduced but susceptible of considerable development through energy and good judgment, comprising cotton, corn, lumber, oysters, tan-bark, walnut, oak, cherry, ash and hickory woods for cabinet-

making and other purposes, glues, stoves, oilstones, lamps, safes, scales, garden tools and agricultural machines, especially reapers, horse-rakes, plows, lawn-mowers, &c., household and kitchen utensils, brooms, smoothing-irons, wash-boards and washing machines, wringers, cottage furniture, cabinet organs, meat, bread and sausage-cutters, ice-cream freezers, porcelain-headed nails, scroll saws and fancy woods, doorlocks, padlocks and window fasteners, muslins, hardware and cutlery, skates, slates and pencils, plain glassware, children's toys, particularly those worked by machinery, wooden utensils, wooden handles and shoe-pegs.

Class III.—Products and manufactures which are unknown upon this market but which might be introduced by proper efforts, among which may be mentioned fresh meat, poultry, butter, eggs, dried peaches and apples, anthracite coal, school furniture, carriage and wagon hubs, spokes, felloes and frames, machine-made nails, horse shoes and nails, match-splints, harness mountings, boot-trees and shoe-lasts, imitation morocco and other leathers, tin and japanned wares, and possibly tram cars and railroad carriages.

In attempting to develop the importance of the articles mentioned in the second category or introduce those of the third, there are several important prerequisites that should be carefully considered, viz.:

1. The style of all manufactured articles intended for this market must conform as nearly as possible to those to which the people of this country have been accustomed. It is all very well to insist that the American styles are superior to those in demand here; but tastes and customs are so deeply rooted in the heads and every-day life of the Flemish, that it will be found to the advantage of manufacturers to accommodate themselves to them, rather than try to change them. Consequently stoves should be constructed with small grates, in order to consume the least fuel possible. Fuel is expensive here, and it is not customary to bake and wash in the same household, so there is no necessity to have such large capacity in the grates and ovens. The Belgian pavements being very rough require strong solid carriage frames and wheels, hence the quiver of the light American carriage proves very objectionable to the Belgians. Likewise in almost every article there is some modification required to suit the customs of the people, or the exigencies of the trade. Consequently, whenever possible, manufacturers or exporters should visit the country and study on the spot the requirements of purchasers in detail.

2. The articles must be brought to the attention of the people, and in a manner to attract them and inspire confidence. This is undoubtedly an essential requisite to success.

As long as the introduction of an article is uncertain, or if it requires considerable personal energy to push it, first-class houses will hardly touch it. Also while extensive purchasers may wish to avoid middlemen, it will in all probability be found necessary to give a monopoly of an article into the hands of one party in order to secure their services; and hence arises the difficult question of selecting reliable and capable agents. But if the home firms could establish branch houses in one or more central cities of Belgium, say Antwerp or Brussels, and send out from these reliable commercial agents, who could properly represent their wares and explain their excellencies, one great object would be gained; confidence would be inspired by the very fact that a central depot was established on Belgian soil which would guarantee purchases against fraud and misrepresentation. If foreigners must be employed, as will probably be the case, they ought to be selected from personal knowledge and acquaintance. Sometimes it has been found practicable for an intelligent agent or part owner thoroughly conversant with the business, to canvass the country and solicit orders, but in such cases the terms must be very easy, and the danger of loss consequently greater.

3. The establishment of show rooms on the co-operative system has been suggested for several months to those unable or unwilling to undergo the expense of establishing a special depot for themselves. Parties in Antwerp have agreed to my suggestion to undergo the expense of hiring rooms to expose such samples as might be intrusted to them, but as there can be no guarantee that the article will prove remunerative, such parties have usually required that all samples shall be sent free of expense; that if sold a certain fixed commission will be charged, and if not the articles will be returned to the owners or disposed of at their expense, risk and peril. As yet there has been little or no response to such overtures. At first view I was inclined to regard the idea of show rooms very favorably, but upon further deliberation I question very seriously if one agent could give much satisfaction to so many various interested parties. While perhaps a fine theory it would probably fail in practice, in that the various articles would not receive the proper amount of special attention and push necessary to place them before the people.

4. Should it be thought impracticable to establish branch houses at Antwerp, to secure reliable agents to push a specialty or to take the risks of the co-operative depot or exhibition rooms, I have to suggest that in the absence of samples something might be done by the liberal use of illustrated catalogues and circulars.

5. The strongest appeal to a Belgian is that of economy. The prices of foreign articles must be lower than those paid for home manufactures. The superiority of material, finish and utility will not go far.

The Flemish reckon by centimes. Consequently the greatest barrier to the successful introduction of our manufactures is the price. One is met on all hands with this observation, "The American articles are splendid, but the prices are too high; we cannot sell them at that figure." Some agents have advised the employment of cheaper material. The solid brass door locks are magnificent, but they cost three times as much as the Belgian and German iron locks. Consequently only the poorest and cheapest quality of most articles can at present be sold. To meet this difficulty present sacrifices must be made to gain the

market and introduce superior first-quality articles. Besides, the Belgian manufacturers are perfectly aware of the danger of a vigorous competition that threatens what was heretofore their monopoly, and they are prepared to reduce their prices to a minimum. In hand-made work the Flemish artisans will probably surpass those of the United States, but in manufactures made by machinery the latter manifest the greatest aptitude and turn off the finest articles; with these our people must eventually succeed.

6. Attention to details must not be forgotten. Every precaution against misrepresentation or sharp practice on the part of agents must be taken. As far as possible errors must be promptly corrected and difficulties amicably arranged. The packing should be done in the most careful and substantial manner, in order to obviate breakage and the delays and inconvenience caused by a missing screw of a piece of machinery. These precautions, supplemented by a judicious personal oversight, energy and determination, will make the American importer a formidable competitor in this market, and secure for his wares a most hearty welcome from the masses of the Belgian people. It should be remarked that while raw materials, agricultural products and articles of food are generally admitted free of duty in this country, as a general thing manufactured articles pay a duty of 10 per cent. ad valorem.

Before closing my despatch I should add that the exports from Belgium to the United States are relatively very small. For 1876 the general exports to the United States amounted to 23,000,000 francs value, while the special exports, or those of Belgian origin, amounted to only 11,000,000, whereas the special imports from the United States to this country for the same year amounted to 110,000,000, or tenfold as great. The chief products and manufactures sent from this country to the United States are glass, beet-root, sugar, cast and scrap iron, steel, fire-arms, rags, clothing, paper, drugs, chemicals, manufactures of wood and machinery. Several of the foregoing articles, which have been heretofore regarded as specialties of Belgian manufacture and exportation, have been decreasing recently in a very extraordinary manner. During the last five years the exports of iron have fallen off from 3,000,000 to 30,000 francs, paper from 1,000,000 to 28,000, zinc from 2,000,000 to 182,000, and lead from 2,000,000 to 85,000 francs. This decline, brought about by a strong foreign competition, causes great concern to the Belgian manufacturers. They freely acknowledge that they have lost the American markets, and must seek outlets for their surplus manufactures in new fields as yet unexplored. Special attention is now being directed to China, Japan, and the interior of Africa when eventually explored and opened up to trade.

A comparison has been recently made between the imports and exports of Belgium for the years 1856 and 1876, where it was shown that while the manufactured articles imported for these two years amounted to 19 per cent. and 22 per cent. respectively, on the contrary the exportation of these articles for the same periods manifest a falling off from 56 per cent. to 48 per cent. of the totals, being a relative loss of eight per cent. Furthermore, that while the increase in the exports of raw materials during the 20 years was three and one-half fold, the increase of the manufactures was only two and one-half fold, or in other words, the manufacturing and industrial interests of Belgium have not kept pace with her commercial progress and development. The industries and manufactures of this country are at present greatly depressed. At no period since the crisis of 1873 has there been such general complaint. Many manufacturers are holding on for the present at considerable losses, in hope for a recuperation soon. Others, unable longer to endure the strain, are going into liquidation and closing their establishments. From all parts of the country are heard loud calls upon the government, praying that some relief may be granted; suggestions and propositions are made in the hope that some way may be found to alleviate the depressed condition of affairs by opening up an increased export trade. Among the suggestions proffered stand prominently the following: The government is called upon to aid and assist in the establishment of subsidized transatlantic steamship lines; in the creation and support of national commercial houses in foreign countries, and national museums or permanent expositions of Belgian manufactures in foreign centers of trade; in granting purses or sums of money for the purpose of helping meritorious young merchants to travel, emigrate to, and establish themselves in foreign countries, and, finally, to augment the number of salaried consuls; and in order to stimulate these and render them more efficient, they therefore propose an increased remuneration and frequent inspections for the purpose of ascertaining the exactitude of the information furnished, and likewise their competence, character and general transactions. If, therefore, instead of shifting the burden from their own shoulders to those of the Government and its commercial agents, and demanding so much patronage and support, the merchants and manufacturers of this country would manifest on their own behalf a little more energy and initiative spirit, and practice an economy commensurate with the demand of the present crisis, the general results would doubtless be more satisfactory and the development of trade greatly superior; for while on general principles governments may foster and encourage home trade, they could scarcely attempt monopolies of foreign trade or competition one with the other.

A floating bee-house has been constructed by Mr. Perrine, a Chicago honey dealer, large enough to accommodate 2000 hives, which he is having towed up the Mississippi River from Louisiana to Minnesota, keeping pace with the blossoming of the flowers, and thus stimulating the honey-making ability of his bees. Returning he will stop about two months somewhere above St. Louis, and will reach Louisiana in October. He

AMERICAN SCREW CO.,

Providence, R. I.,

MANUFACTURERS OF MORE THAN 4000 VARIETIES OF PRODUCT,

AND INCREASING THE ASSORTMENT DAILY.

Machinery employed contains important inventions recently patented, and which are designed to produce Screws at a **lower cost to the consumer** than has ever been attained.

All goods are distributed through the Hardware trade, to whom a liberal discount will be allowed.

INTERNATIONAL EXHIBITION. PHILADELPHIA, 1876.

(No. 235.)

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed an award in conformity therewith.

REPORT ON AWARDS.

PHILADELPHIA, November 8, 1876.

Product: Iron, Brass and Steel Screws, Tire and Stove Bolts, Rivets.

Name and address of Exhibitor: American Screw Company, Providence, R. I.

The undersigned having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for Award, for the following reasons, viz: **Being of a quality nearly approaching perfection, showing the highest attainment in this branch of manufacture.**

G. L. REED. Signature of the Judge.

Approval of Group Judges.

Daniel Steinmetz,
Jas. Bain,
Chas. Staples,

G. L. Reed,
J. D. Imboden,
Dav. McHardy.

A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
Given by authority of the United States Centennial Commission.

A. T. GOSHORN, Director-General.

J. R. HAWLEY, President.



After forty years' experience we offer to the trade our Centennial Screws, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the improved article only. To introduce them, they will be sold at the same price as the old style screw.

The new screws will be packed in manila colored boxes with the new label covering end of box, and enlarged figures showing plainly contents.

To distinguish this screw we have adopted a trade-mark, which is also secured to us.

The accompanying engravings show the progress of making screw from the old blunt point to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all

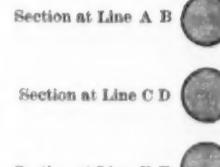


1776.



1846.
Patented August 30.

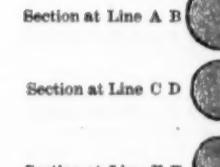
A
B
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1876.

Patented May 30.
COVERED BY TRADE MARK.

B
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the strains of forcing the screw into the wood naturally concentrate.

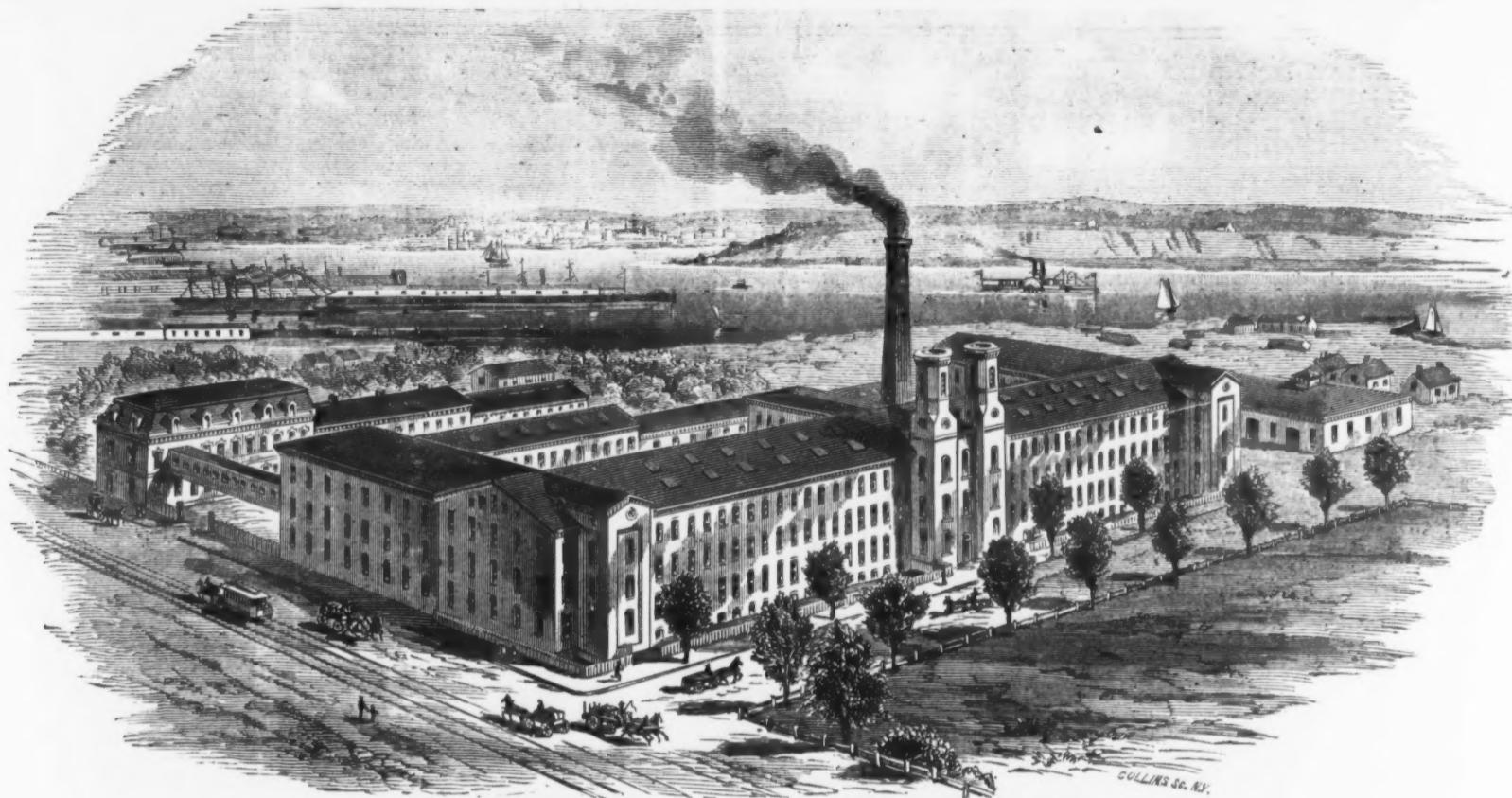
To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our new screw that not only is the sharp angle avoided, but the strength very much increased, as illustrated. See sections at lines.

CLAIM.

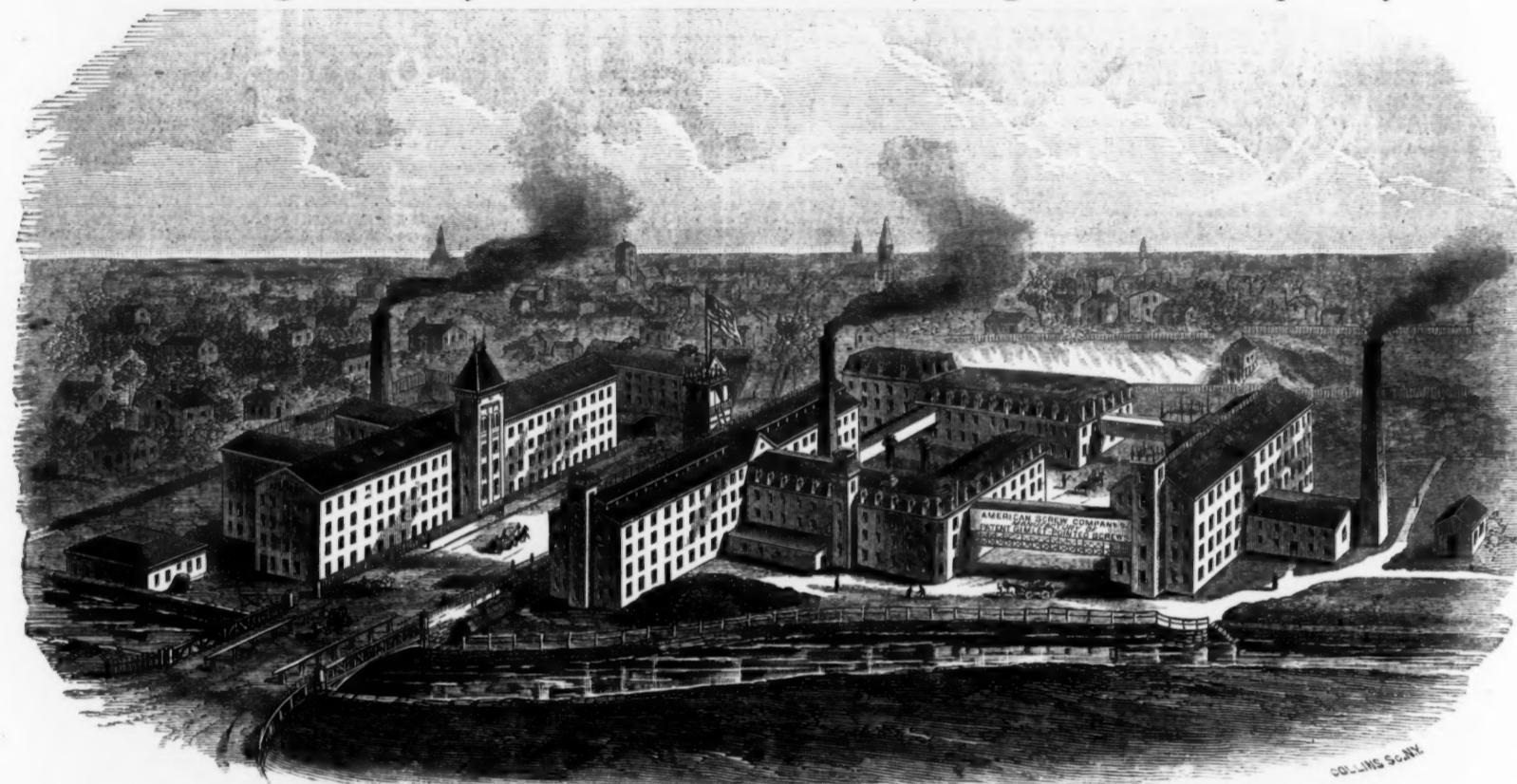
"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

On the opposite page will be found illustrations of the various Works of the company.



NEW ENGLAND MILL.

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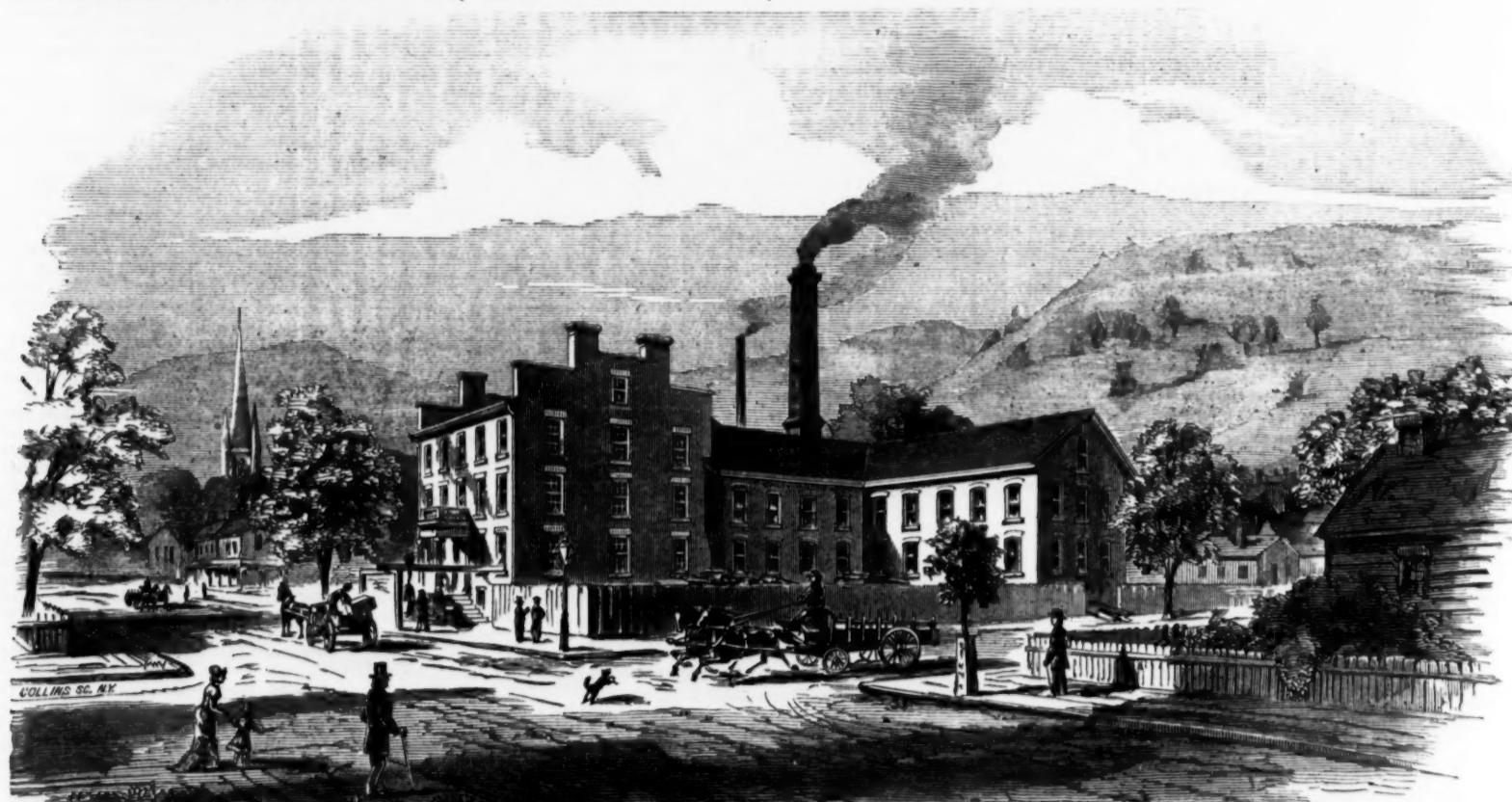
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The Substitution of Wire Ropes for Chain Cables.

In one of the recent issues of *Iron* the following article appears from the pen of G. L. Abegg, A. I. N. A.:

Since the introduction of steam power to ships (about 1830), and the introduction of iron ships some ten years afterward, great improvements have been made in the form of vessels as well as for increasing their speed. But we can hardly wonder that some details still remain in their primitive state. Some of these, the stopping of a vessel when near shore, her safe riding at anchor, and the means provided for it, deserve to be brought under attention.

The operation of coming to anchor, i. e., stopping the progress of a vessel, has not in any way been improved since 1812, when the clumsy hemp hawser was replaced by chain cables, although the mechanical appliances for letting go and heaving up the anchor and chain have undergone several improvements. The old wooden so-called Malaise anchor has been entirely superseded; we have seen Pering, Rodger, Porter, Trotman, Hawkins, Martin and Smith trying to combine strength and holding power with lightness and easy fitting and stowing, &c., with more or less success. Mr. Pering commenced some forty years ago to suggest that the bars of iron of which the shanks and arms of the anchor were composed should be welded together when first brought out of the fire, by means of the Hercules, the biggest hammer then known, worked by some 30 to 40 men, instead of by the light sledge hammer; and he introduced short shank anchors with long arms. Rodger improved on his own pickaxe palmless anchor. Porter, thirty years ago, invented his movable arm anchor, and Trotman improved on it by uniting palm and horn. Hawkins introduced the stockless anchors, both flukes holding at the same time, and Martin, and later on, Smith, improved so considerably on this principle that I think only the enormous price (62 against 16) is barring their invention from general adoption. While these improvements on anchors were being made, it was often proved that a marked decrease of shipwrecks attended them. We have never heard, however, how many cables broke, and how many more ships were lost because they were not furnished with proper machinery to stop the headway. Nobody, I think, will deny that if it was possible to let go an anchor aft instead of forward, or to be able to bring out an anchor with cable attached to it, the means would be at command of saving many ships, valuable cargoes and lives. With the heavy chain cables now in use, both commanders and owners of ships are at grave disadvantage, which to say the very least, would be much mitigated were they replaced by wire ropes. While an ordinary anchor for a 1000 tons ship weighs 1½ tons, and could by better construction (vide Smith's patent) be reduced to 1 ton weight, the proportionate chain cable of 90 fathoms weighs 7 tons, and is quite unmanageable; a wire rope fully equal to acting as substitute for it would be little more than 1 ton weight, and could be easily handled. One of the first papers read at the opening session of our institution (1860) was on "Chain Cables," by Mr. G. W. Lenox, who stated that his partner, Sir Samuel Brown, took out the first patent for short twisted link chains (1811) to resemble a hempen cable, and to run smoothly and easily. He also rigged a vessel entirely with chain instead of hemp, and although he failed in this last application, still, up to the present time, we have to thank him for having chain everywhere where strength and welding power are required. The first merchant vessel that worked a chain cable was the *Perseverance*, Captain Livingstone, some 60 years ago. Now, while we have wire rope, with its known usefulness for so many purposes, and can produce it of iron, steel, and even of a better material, which must soon supersede the galvanizing, and can make the wire rope more ductile, pliable and elastic, with total prevention of corrosion, why not away with chain altogether and replace it by the more reliable and lighter material?

The first chain cables were made at a cost of £112 a ton, material being supplied at £24 a ton then, and the advantages claimed over the hempen ropes were: 1. Facility in handling. 2. Stowage of ship enlarged by placing chain in an unoccupied space. 3. A saving by dispensing with ballast in moving the ship from dock to dock (weight of chain acting as ballast). 4. Greater security of the ship when at anchor; and these advantages being appreciated, a fair proportion of orders for the merchant navy were booked even at this extremely high price. In 1830 a chain cable cost £40 a ton. Then they were considered well introduced. The Admiralty introduced proving machines, and laid down rules for sizes and forms of links, shackles, &c. The proof strain was 630 pounds to the circular ½ of an inch of its contents, and 1150 pounds the breaking strain for best Welsh iron chain—the same as we consider as quite safe now. Later on, best cable iron could be bought for £7. 10/- a ton, and chains were manufactured and delivered for £15 a ton, at which price they are to be had now, though I feel sure that no chain cable manufacturer who sells at £15 a ton at present pays anything like £7. 10/- for his material. No doubt, the chain cable has accomplished what it was intended for, and its greater strength than a hemp cable is proved by the fact that only since the introduction of iron cables the Admiralty has found it necessary to strengthen the shanks of anchors. But we must not forget that every link in a chain cable is a complete and independent structure of itself, and the failure of a single one of these will lead to the failure and loss of, for instance, every one of the 1800 links composing a 1-inch cable. Even suppose you take the best iron, the best workmen, it would be absurd to expect that in the many thousands of links annually made, not one should have a bad weld or other defect. As a preventive

measure, public testing machines were introduced; but I ask any practical man whether absolute security in the cables is gained by the test, and whence still arises the breaking of chain cables with very little strain upon them? Many sudden breakages occur during frosty weather, and perhaps no better proof of the danger in such circumstances could be cited than the fact that the fishermen on the coast of Nova Scotia find it necessary to splice a length of hempen cable to the chain in order that due resistance may be offered to atmospheric influences on the part of the cable reaching from the vessel to the surface of the water. The North American fishermen have no hesitation in making the assertion that chain cables are not the best and most reliable anchor attachment, and can and ought to be substituted by something better.

To begin with the advantages gained 60 years ago by the chain cables over the hempen ropes—facility in handling, better stowage, dispensing with ballast, and greater security—I may ask, would not all these points be much better attained by the introduction of wire ropes now? As far as running out smoothly and easily goes, I need not remind anybody of the smoothness and ease with which a 2½-inch chain cable runs out of the hawse-pipes of one of our large ocean steamers coming to anchor at the tail of the Bank. Ropes and rigging of iron and steel have to a large extent replaced already hempen ropes for many purposes on board our ships of the merchant navy, the greater strength of the former admitting a considerable reduction in the weight. A hempen hawser, for example, of 9 inches circumference, is equal in strength to an iron wire rope hawser of 3½ inches, or, when made of steel, of 3 inches circumference, their respective weight being as 20 to 12 and 7. A chain of the same strength would weigh 40, or double that of a hempen rope, while steel is again only one-third of the latter in weight. The advantage is obvious. At the same time, finding that even steel is subject to corrosion and strong chemical action by sea-water, though in less measure than iron, I have been looking for a non-oxidizing metal to replace iron or steel, and have had long correspondence on the matter with the directors of the Phosphor Bronze Company, London, whose manufacture has grown very much in favor lately for marine engines, in particular for frictional parts, such as bearings, slide valves and piston rings; has been proved by experiments to resist well the action of sea-water, and has given great satisfaction in wire ropes used in mines, in spite of the impulsive forces that act upon it, as well as the acid waters, which soon would render an iron or steel wire rope unsafe. I annex two tables which show the comparative strength, size and weight of several cables, and also give some results of Mr. Kirkaldy's experiments on phosphor-bronze wires. You will see that while a steel wire hawser with regard to cost and strength would most admirably fulfill the requirements of a cable, the expense (£130 a ton) of a cable made of phosphor-bronze metal, would, on the other hand, be balanced by the following advantages: (1) one-fifth to one-sixth weight of chain cables; (2) gaining of stowage; (3) facility in handling; (4) gaining of carrying capacity; (5) greater security; (6) three-quarter value of the cable when old, rendering the cost of renewal very little; (7) the great advantage of being able to use part of the cable for towing purposes and enabling ships to carry an anchor at the stern. The introduction of chain cables in lieu of hempen ropes created a far greater revolution in the equipment of vessels than wire rope would do now if it were introduced instead of the chain cable.

TABLE I.—Comparative Strength of Cables for Ships.

Tons per ton.	Sail. Gross.		Tonsage.
	St'm'r. Gross.		
3000	1000	1000	
2500	833	833	
2000	667	667	
1800	556	556	
1600	444	444	
1500	400	400	
1400	357	357	
1300	316	316	
1200	278	278	
1100	243	243	
1000	200	200	
900	178	178	
800	156	156	
700	133	133	
600	111	111	
500	90	90	
400	70	70	
300	55	55	
200	33	33	
100	16	16	
50	8	8	
25	4	4	
10	2	2	
5	1	1	
2	0.5	0.5	
1	0.25	0.25	
0.5	0.125	0.125	
0.25	0.0625	0.0625	
0.125	0.03125	0.03125	
0.0625	0.015625	0.015625	
0.03125	0.0078125	0.0078125	
0.015625	0.00390625	0.00390625	
0.0078125	0.001953125	0.001953125	
0.00390625	0.00098828125	0.00098828125	
0.001953125	0.0004970703125	0.0004970703125	
0.00098828125	0.00012463378125	0.00012463378125	
0.0004970703125	0.00003115869375	0.00003115869375	
0.00012463378125	0.000007739346875	0.000007739346875	
0.00003115869375	0.000001953125	0.000001953125	
0.000007739346875	0.0000004970703125	0.0000004970703125	
0.000001953125	0.00000012463378125	0.00000012463378125	
0.0000004970703125	0.00000003115869375	0.00000003115869375	
0.00000012463378125	0.000000007739346875	0.000000007739346875	
0.00000003115869375	0.000000001953125	0.000000001953125	
0.000000007739346875	0.0000000004970703125	0.0000000004970703125	
0.000000001953125	0.00000000012463378125	0.00000000012463378125	
0.0000000004970703125	0.00000000003115869375	0.00000000003115869375	
0.00000000012463378125	0.000000000007739346875	0.000000000007739346875	
0.00000000003115869375	0.000000000001953125	0.000000000001953125	
0.000000000007739346875	0.0000000000004970703125	0.0000000000004970703125	
0.000000000001953125	0.00000000000012463378125	0.00000000000012463378125	
0.0000000000004970703125	0.00000000000003115869375	0.00000000000003115869375	
0.00000000000012463378125	0.000000000000007739346875	0.000000000000007739346875	
0.00000000000003115869375	0.000000000000001953125	0.000000000000001953125	
0.000000000000007739346875	0.0000000000000004970703125	0.0000000000000004970703125	
0.000000000000001953125	0.00000000000000012463378125	0.00000000000000012463378125	
0.0000000000000004970703125	0.00000000000000003115869375	0.00000000000000003115869375	
0.00000000000000012463378125	0.000000000000000007739346875	0.000000000000000007739346875	
0.00000000000000003115869375	0.000000000000000001953125	0.000000000000000001953125	
0.000000000000000007739346875	0.0000000000000000004970703125	0.0000000000000000004970703125	
0.00000000000000001953125	0.00000000000000000012463378125	0.00000000000000000012463378125	
0.000000000000000004970703125	0.00000000000000000003115869375	0.00000000000000000003115869375	
0.000000000000000012463378125	0.000000000000000000007739346875	0.000000000000000000007739346875	
0.000000000000000003115869375	0.000000000000000000001953125	0.000000000000000000001953125	
0.0000000000000000004970703125	0.00000000000000000012463378125	0.00000000000000000012463378125	
0.00000000000000000012463378125	0.00000000000000000003115869375	0.00000000000000000003115869375	
0.00000000000000000003115869375	0.000000000000000000007739346875	0.000000000000000000007739346875	
0.000000000000000000007739346875	0.000000000000000000001953125	0.000000000000000000001953125	
0.000000000000000000001953125	0.0000000000000000000004970703125	0.0000000000000000000004970703125	
0.00000000000000000000012463378125	0.00000000000000000000012463378125	0.00000000000000000000012463378125	
0.00000000000000000000003115869375	0.00000000000000000000003115869375	0.00000000000000000000003115869375	
0.000000000000000000000007739346875	0.000000000000000000000007739346875	0.000000000000000000000007739346875	

The Brooklyn Bridge Superstructure.

There are murmurings of dissatisfaction among the steel manufacturers on account of a recent decision of the Bridge Commissioners unfavorable to their interests. They affirm that the specifications call for both steel and iron, but that in advertising for proposals for materials to be used in the superstructure—i. e., the entire mass of iron-work to be suspended from the cables—the steel manufacturers are not invited to share in the competition. The company, as will be seen below, want 5800 tons of iron, and it is alleged by parties interested that steel can be furnished which would secure for the superstructure a strength at least equal to that of iron, and at the same time reduce the weight of metal employed about one-half, with but a trifling increase of cost—nothing to be compared with the advantage of relieving the cables from a heavy strain. In other words, by adopting steel the strength of the bridge superstructure might be increased 50 per cent. without adding to the weight contemplated in the original design. The point thus made possible of attainment, they argue, is invaluable, since the question of running locomotives over the bridge, or adopting an endless chain and stationary engine as finally resolved upon, was controlled solely by considerations of weight. In building the St. Louis bridge the preference for steel was so positive that \$15,000 was paid for the right to manufacture "chrome steel" to the extent desired, though it is intimated in other quarters that the quantity of steel actually used in that structure was comparatively small. Notwithstanding the evidence in their favor, the advocates of steel assert that when the specifications came before the bridge trustees they were referred to a special committee, who reported that "a part of the committee waive their opinion in favor of steel solely on the direct and explicit assertion of their chief engineer, Mr. Roebling, that to make the proposed change would materially delay the completion of the bridge," &c.

Observing that opinions were widely diverse, giving rise to much heated discussion, our reporter found opportunity to converse with Engineers Payne and Martin, of the Bridge Company, with reference to the alleged grievances. The latter stated in substance that the forms of steel required by them, such as channel bars, I beams, H beams, angle iron, &c., had never been made in this country; that it would be necessary to get up new rolls and other appliances of steel manufacture, and the company was not inclined to take the initiative, in making experiments where such large interests were at stake.

Engineer Payne was much more explicit, having given the subject earnest consideration. He had visited in person all the principal rolling mills in the country almost without exception, and had been not only surprised but disappointed in finding that not one of them had successfully made steel channel bars of the forms and sizes required. If he had found parties equipped with the necessary plant they certainly would have had a chance. Besides channel bars, of which the superstructure is mainly composed, there were two kinds of suspenders, part of steel wire rope and the remainder of solid steel rods. He could not have said, "You can have the working of all this if you will get your plant ready," because it was necessary to put out the entire work to bidders in competition. Two or more concerns signified their readiness to procure the needed plant at whatever cost, their idea being at the same time to make provisions for the future manufacture of steel plates for shipbuilding purposes, none of which are now made in the United States. They only wished to be assured that after having made an expenditure of perhaps \$200,000 in providing rolls and appurtenances they would have the contract, but under the circumstances no pledge could be given. Mr. Payne, in justification of the course which had been pursued with reference to inviting proposals, called attention to the report of the special committee to the bridge trustees, stating that it would not be advisable to resort to a structure of steel alone, or of steel and iron. The chief engineer, as quoted by them, says: "It is not practicable to obtain steel of the form and value required without a lapse of time, involving great delay in the completion of the bridge, a possible disappointment at last and a large increase of cost to meet the construction of rolls, &c., adapted to the form of materials required." So far from being prejudiced against the use of steel, Mr. Payne acknowledged having a decided preference for this material, so far as he was personally concerned, though he had studiously refrained from betraying any bias whatever, or committing himself to any controversy—choosing rather to be governed by facts on their merits. He predicts, however, that before two years have passed we shall have in this country establishments for rolling steel equal to every requirement; that the stimulus now imparted by the demands of the East River Bridge Company will be attended with effect, corresponding to those which followed when they demanded steel wire, a material which at first could not be made of a suitable quality on this side of the Atlantic, but which now is produced here in perfection. As regards steel suspender rods, the remark was dropped *sub rosa* in the engineers' office that one or more well-known American steel companies were making excellent goods, too fine, in fact, for their purposes, and better suited to choice cutlery. This fine steel lacked elasticity, yielding only in the smallest degree to the severest tests applied, and ranking high for certain special uses, but not suited to the requirements of the bridge.

In the foregoing we have endeavored to present impartially some of the facts which have arisen in private discussions relating to the recent actions of the bridge commissioners, and shall indulge a hope that a new stimulus will be imparted to the great and growing industry represented by the steel manufacturers of the United States.

The following is a description of the superstructure of the bridge as detailed in the specifications:

The main span has a length of 1595 feet 6 inches from center to center of towers. Each land span has a length of 930 feet from

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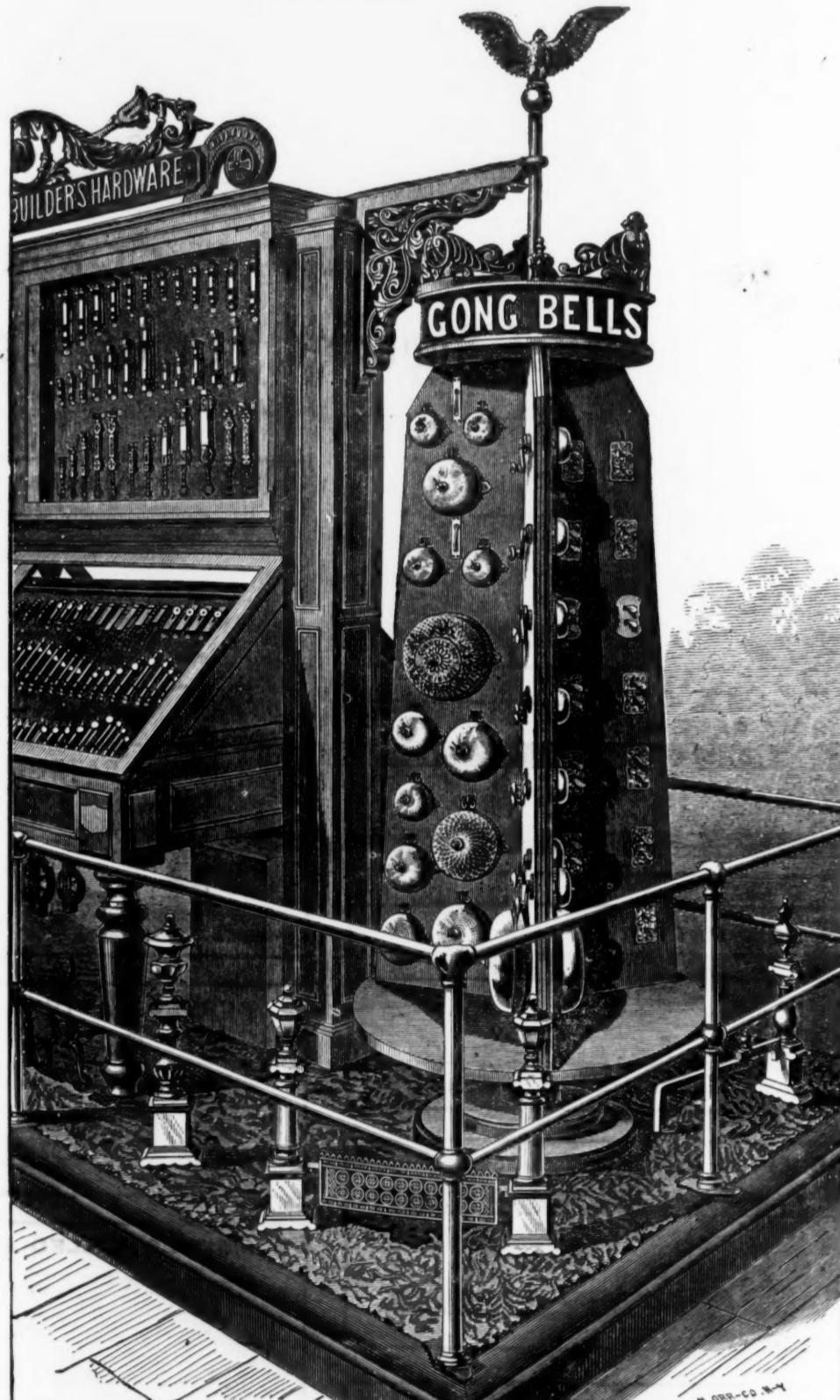
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center of tower to face of anchorage. The frame work of the superstructure has a width of 86 feet, and is suspended from four 16-inch steel cables by means of suspenders. In the land spans the equilibrium of curves requires the main cables to be 8 feet below grade at the face of the anchorage, thus bringing the floor line above the cables for a distance of 250 feet out from thence; the suspenders are here replaced by posts standing on the cables. The grade of both sides is fixed at 3.25 feet per hundred. The main floor beams are suspended at a uniform distance of 7 feet 6 inches from center, with intermediate beams half way between them. There are six trusses running lengthwise of the bridge, so that transversely the structure is arranged in five divisions. The two outer divisions are each 18 feet 9 inches wide in the clear between the trusses, and are intended for vehicles, including horse cars, for which tramways are provided. All travel in one division in the same direction.

Two intermediate spaces of 12 feet 8 inches have steel rails laid in them, and are devoted to passenger cars run by endless ropes driven by stationary engines. The central space of 15 feet 7 inches is occupied by a promenade elevated 9 feet 10 inches above the other floors, except at the towers, where it is raised still higher, so as to pass around the intervening central shaft above the passenger cars.

The four middle trusses are 16 feet in depth, and the two outer ones 9 feet 6 inches deep. The trusses consist of vertical posts, each made of two 5-inch channels tied together with diagonal braces, a top chord composed of two 9-inch channels with an overlying flat plate, a bottom chord of two 9-inch channels below and two 6-inch channels on top of the floor beams, and truss rods of flat eye bars secured to the posts and chords by pin connections. The sections of the chords, and also of the diagonals, are proportioned to meet the requirements of their respective locations, being somewhat heavier at the quarters than at the center. The over-floor stays extend 437 feet out from the center of the towers, and for that distance the lower chord section is proportioned to resist the horizontal thrust of the stays. This section is greatest at the towers, where the trusses are further strengthened so as to sustain their own weight for 50 feet on either side. At the towers the trusses are anchored down to eye bars built in the masonry.

The dimensions of this truss work in the towers differ slightly, because the New York tower, is 3 feet wider than the Brooklyn tower in the direction of the line of the bridge. The first floor beam, however, is in each case placed at the same uniform distance from the center of the tower. All truss posts are laterally supported by braces of T or angle iron, and each pair of high trusses is connected overhead and then laterally braced. Expansion and contraction of the structure is provided for in four places, by means of slip joints in the trusses and framework, located beyond the end of the over-floor stays, about 445 feet from the towers. At the towers all parts are firmly anchored to the masonry, a most essential condition in locality so exposed to storms as the present one. By the introduction of these slip joints it becomes possible to rivet all parts of the framework together in a rigid, unyielding manner, thus giving much greater efficiency to the trusses than has previously been obtained in other wire cable bridges. In the land spans, however, where the floor lies for about 250 feet above the cables, the iron framework is attached to the latter in such a manner as to make continuous riveting impracticable. The expansion is here provided for by making oval bolt holes in the splicing plates of the chords, thus making short divisions of about 30 feet in length, in which the small amount of expansion can accommodate itself. Any impairment in rigidity, caused by these smaller slip joints, is made up by an increased depth of truss at this point. In that portion of the land spans where the cable passes below the floor, the ordinary cable band no longer suffices for an attachment, but is replaced by a special contrivance for each point, so arranged as to admit of raising or lowering the floor beams for the purpose of regulating the grade.

The weight of the iron required for the superstructure of the East River Bridge is estimated at 5800 tons. The iron used must meet the following requirements: It must have a tensile strength of not less than 50,000 pounds per square inch. Tested in lengths of one foot, it must elongate 15 per cent., and the area of section at the point of fracture must be reduced 25 per cent. The steel used must have an ultimate strength of 80,000 pounds per square inch and an ultimate stretch of 15 per cent. in lengths of one foot.

Antique Bronzing.—The repeated applications in copper or brass of alternate washes of dilute acetic acid and exposure to the fumes of ammonia will give a very antique-looking green bronze, but a quick mode of producing a similar appearance is often desirable. To this end the articles may be immersed in a solution of one part of perchloride of iron in two parts of water. The tone assumed darkens with the length of immersion. Or the articles may be boiled in a strong solution of nitrate of copper. Or, lastly, they may be immersed in a solution of two ounces nitrate of iron, and two ounces hyposulphite of soda in one pint of water. Washing, drying, and burnishing complete the process.

Since 1840 the fastest steamships in the Atlantic trade have increased their speed from 8.3 knots per hour to 15.6 knots, and the consumption of fuel per 100 indicated horse-power has been reduced from 4.7 hundredweight to 1.9. In 1877 there were 182 steamers of 556,650 tons in the service, of which 125 of 377,905 tons were English. The record of rapid passages since 1840 shows a gradual reduction from 14 days to 7, and during the same time 56 steamers have been lost, with 5430 lives. The year 1873 was the most disastrous of any, 7 vessels with 829 lives being lost, among them the Atlantic, with 545 lives. In 1854 the City of Glasgow, with 480 lives, and the Arctic, with 322 lives, were lost, making that year the next to 1873 the worst on record.

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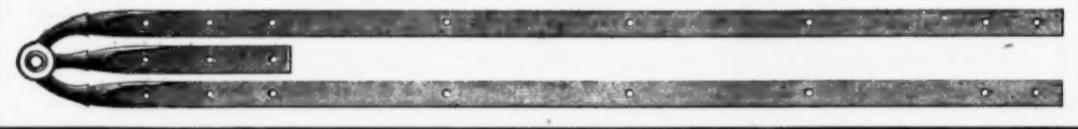
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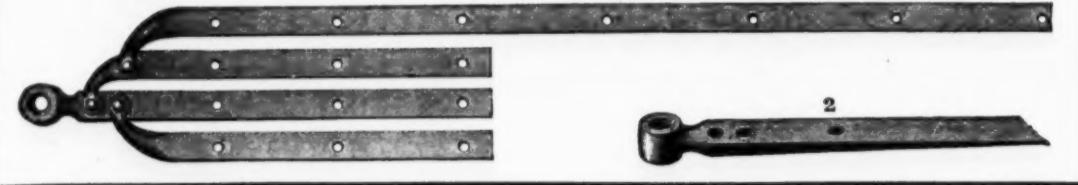
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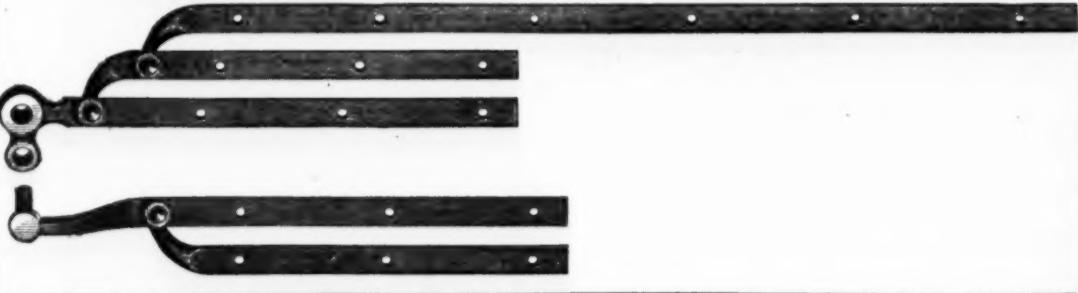
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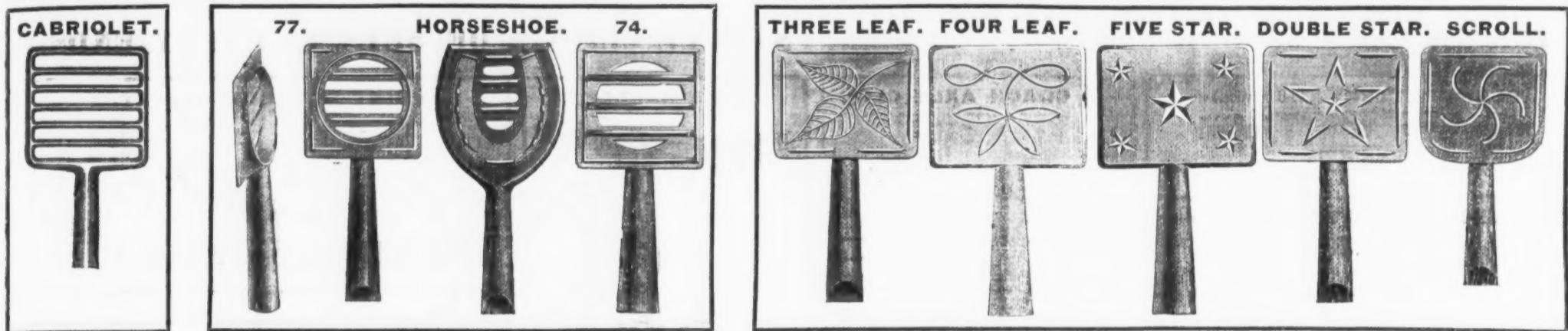
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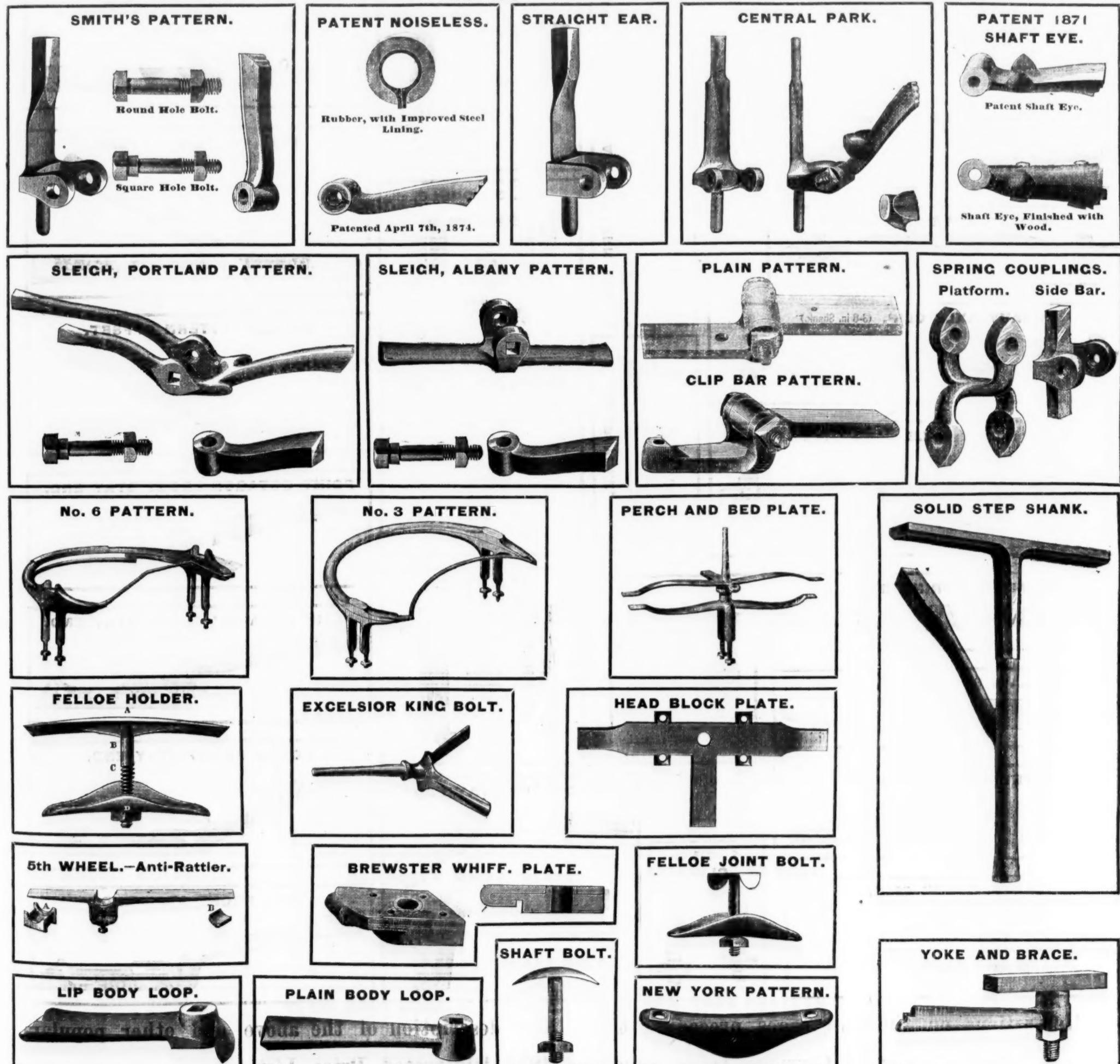
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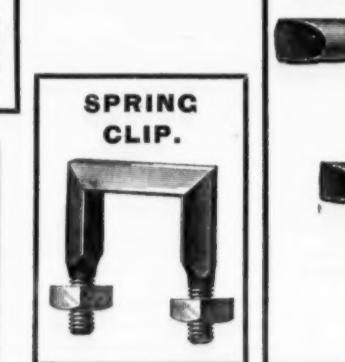
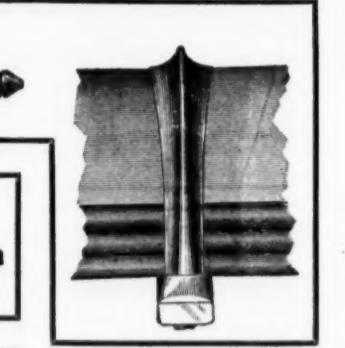
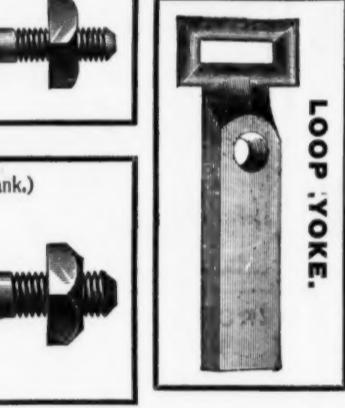
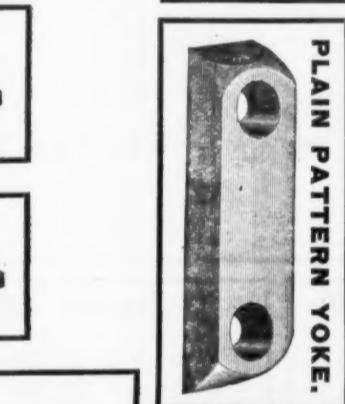
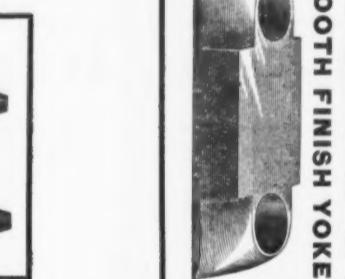
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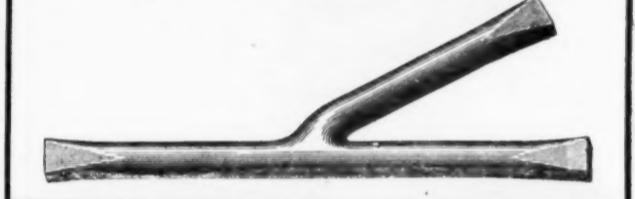
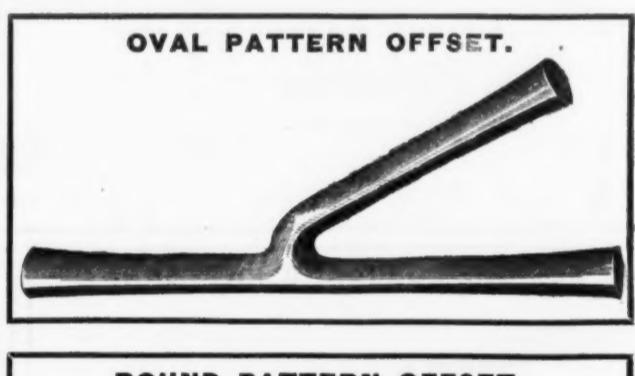
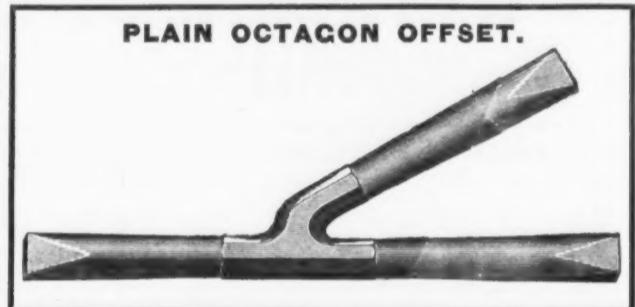
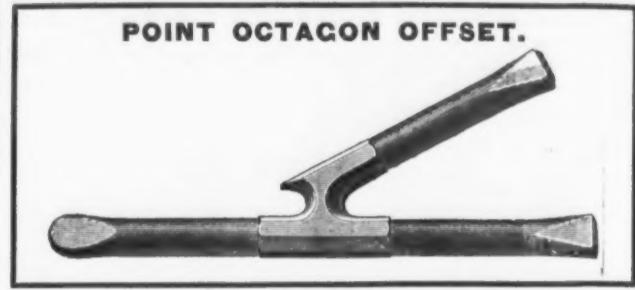
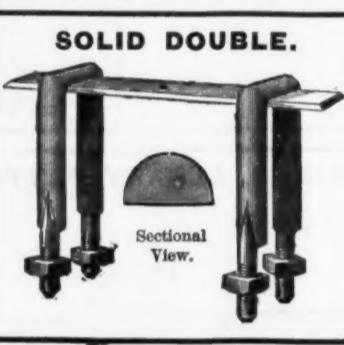
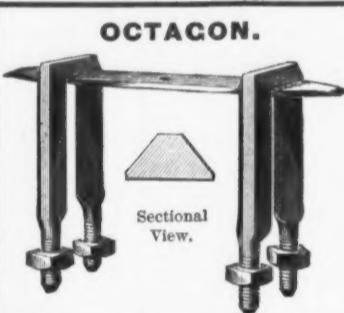
MANUFACTURERS,

Plantsville, Conn.,

AXLE AND SPRING BAR CLIPS.



SADDLE CLIPS. OFFSETS AND STAY ENDS.



See Illustrations on the two pages preceding this. For description of the above and other popular Forged Carriage Irons, send for 1877 Illustrated Price List.

B. KREISCHER & SON,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,

Established 1845.

Office, foot of Houston Street, East River,

NEW YORK.

The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand, from my own mines at New Jersey and Staten Island, by the cargo or otherwise.

NEWTON & CO.,

Successor to

PALMER, NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings

Cylinder Brick, &c., &c.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK
And Furnace Blocks

DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

A. HALL & SONS, Perth Amboy, N. J.

ESTABLISHED 1845.

HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1866.

FIRE BRICK

of reliable quality for all purposes, manufactured o the best New Jersey Fire Clays. Also, Architectural Terra Cotta, Fire Clay, Fire Bricks, Kaolin, Ground Fire Brick and Diamantine Building Brick.

Brooklyn Clay Retort
 AND

FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Bricks, Gas House and other Fire Clay Works. Dealers in all kinds of Fire Clay and Fire Sand. Clay bank at Burt's Creek, New Jersey. Manufactury: Van Dyke, Elizabeth, Richards and Partition Sta., Brooklyn, N. Y. Office No. 88 Van Dyke St.

Watson Fire Brick Manufactory
 ESTABLISHED 1856.

JOHN E. WATSON, Perth Amboy, New Jersey.

Manufacturer of

FIRE BRICK,
 For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c.

FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE

HENRY MAURER,
 Proprietor of the

Excelsior Fire Brick & Clay
 Retort Works,

Manufacturer of FIRE BRICK, HOLLOW

BRICK AND CLAY RETORTS.

WORKS 1 PERTH AMBOY, NEW JERSEY

Office & Depot: 418 to 422 East 23d St., N. Y.

TROY FIRE BRICK WORKS

Troy, N. Y.,

JAMES OSTRANDER & SON,

Manufacturers of

FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, etc. Miners and

Dealers in Woodbridge Fire Clay and Sand, and Staten Island Kaolin.

Established 1864.

GARDNER BROTHERS,
 MANUFACTURERS OF

STANDARD SAVAGE

Fire Brick, Tile & Furnace Blocks,

OF ALL SHAPES AND SIZES.

Clay Gas Rotors and Retort Settings,

AND

Miners and Shippers of Fire Clay.

OFFICE: 376 Penn Ave., Pittsburgh, Pa.

WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

BORGNER & O'BRIEN,

Manufacturers of

Fire Bricks,

Clay Gas Retorts,

Retort Settings,

Tiles, Blocks, &c., &c.

23d St., below Vine,

PHILADELPHIA.

Eighteen years' practical experience.

CYRUS BORGNER.

WM. J. O'BRIEN

ANCHOR BRAND

A X L E S,

For all Styles Carriages and Wagons.

Annual production 180,000 sets.

SHELDON & CO., Auburn, N. Y.

CHAS. N. BACON,

Felting & Wadding Manufactory,

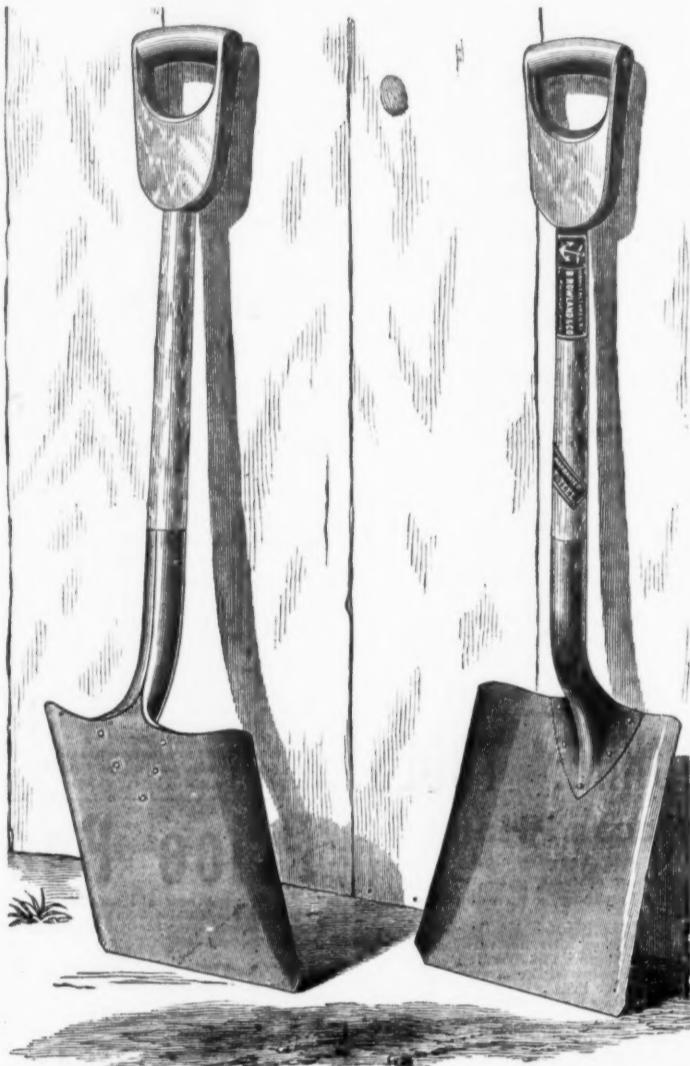
Winchester, Mass.

Patent Felt Buffer Wheels for Hardware and Cutlery Manufacturers, Brass Finishers, Nicke Platers, Jewelers, &c. Felt for Bolsters and Steam Pipes, Harness Makers, &c. Patent Black Board Braces.

Office & Salesroom 22 Exchange Place Boston.



B. ROWLAND & CO.,
 PHILADELPHIA.



B. Rowland & Co.'s Patent Riveted Shovel.
CAST STEEL.

B. Rowland & Co.
CAST STEEL.

All goods of this brand (which is copyrighted) are warranted in every respect, and we will guarantee that the following named PATENT RIVETED Shovels and Spades will be made from the gauge of Cast Steel specified:

D Handle Square Point Shovel	13 gauge
D " Round "	14 "
Long Handle Round Point Shovel	15 "
D Handle Spades	11 "
D " Western Coal Shovel	15 "
D " Anthracite Coal Shovel	14 "

Gauged by Stubbs' Gauge.

B. ROWLAND & CO.,

CITY OFFICE,

27 North Fifth Street, Philadelphia, U. S. A.

Works at Frankford, Phila., U. S. A.

NEW YORK WAREHOUSE, 100 Chambers St.

Commerce of the United States with Japan.

The following statement shows the value of the commerce of the United States with Japan for each of the eighteen fiscal years ended June 30 (from 1859 to 1876 inclusive), compiled from the United States official reports on commerce and navigation:

Years.	Domestic Exports.	Foreign Exports.	Total Exports.	Imports.	Total Commerce.
1859.	\$89,856	\$48,918	\$138,774	\$905	\$205
1860.	14,876	25,677	40,553	102,566	123,865
1861.	35,348	87,028	122,950	87,513	143,119
1862.	161,266	53,677	213,937	73,831	210,463
1863.	384,344	117,057	501,391	270,557	320,737
1864.	420,000	64,759	485,759	349,945	375,695
1865.	478,551	66,221	534,772	1,813,364	349,945
1866.	600,136	100,072	800,108	2,618,487	348,505
1867.	780,168	85,872	866,049	2,420,182	345,222
1868.	2,836,720	1,120,342	3,956,061	3,245,317	7,201,378
1869.	915,665	614,049	1,029,714	4,153,365	5,173,079
1870.	614,049	1,630,341	5,397,999	7,028,332	7,028,332
1871.	987,757	642,660	1,620,417	5,397,999	5,326,846
1872.	4,304,289	123,977	4,486,266	9,174,243	13,660,509
1873.	7,000,000	400,000	7,400,000	9,253,374	17,179,009
1874.	18,8-8,107	61,040	1,869,148	6,388,370	8,388,370
1875.	1,647,197	14,710	1,661,933	7,772,262	9,435,235
1876.	1,090,457	1,309	1,101,766	15,508,170	16,600,926
Total for eighteen years.	\$33,645,572	\$3,485,424	\$27,130,999	\$68,752,244	\$95,881,240
Average per annum.	1,833,643	193,634	1,507,277	3,810,569	5,326,846
Average per annum for last ten years.	2,379,047	317,663	2,596,710	8,660,180	9,209,890
Average per annum for last five years.	3,316,021	290,946	3,436,907	9,639,492	13,076,459
Average per annum for last five years per capita of population of Japan (33,110,825, c. 1872).	\$0.10	\$0.29	\$0.39	\$0.39	\$0.39

The following statement shows the several ports in the United States at which exports were made to Japan and imports received from Japan, and the value of the same at each port, during the fiscal year ended June 30, 1877, compiled from the official report on commerce and navigation:

Ports.	Domestic Exports.	Foreign Exports.	Total Exports.	Imports.	Total Commerce.
New York.	\$64,645	.....	\$64,645	\$2,812,925	\$23,459,675
Philadelphia.	41,535	.....	41,535	41,535	41,535
San Francisco.	1,851,650	385,843	2,236,493	10,976,433	13,113,332
Willamette, Oregon.	75	.....	75	75	75
Totals.	\$2,539,641	\$385,243	\$2,924,884	\$13,689,433	\$16,614,317
Carried in American vessels.	\$1,095,083	\$81,305	\$1,177,387	\$5,770,818	\$6,948,105
Carried in foreign vessels.	1,443,659	303,038	1,747,597	9,066,212	9,066,212
Totals.	\$2,539,641	\$385,243	\$2,924,884	\$13,689,433	\$16,614,317
Total imports dutiable.	.....	.....	.....	\$290,737	2 per cent.
Total imports free of duty.	.....	.....	.....	13,398,702	98 per cent.
Totals.	.....	.....	.....	\$13,689,433	.....
Total exports of merchandise.	.....	.....	.....	.....	42 per cent.
Total exports of specie.	.....	.....	.....	1,679,538	57 per cent.
Total.	.....	.....	.....	\$2,924,884	.....
Total imports of merchandise.	.....	.....	.....	\$13,689,433	.....
Total imports of specie.	.....			

The firm of Potter & Hoffman, of Philadelphia, was dissolved on the 1st of June. Business will be carried on as before by Mr. Hoffman under the style of J. W. Hoffman & Co.

Mr. John W. Nystrom has opened an engineering office at 220 South Fourth street, Philadelphia, principally for the construction of machinery, boilers and steamers.

Mr. P. L. Weimer, of the Weimer Machine Works, has quite a number of men at work taking apart and loading on cars for shipment the large blowing engine he has built for the Messrs. Eckert of Reading. It was tested well before last for the purpose of ascertaining its full power. "The engine, though far from being the largest ever built at the works," says the *Lebanon Courier*, "is one of the most powerful in the country. From the records of the engine's performance we take the following:

Diameter of blowing cylinder..... 75 inches.
steam cylinder..... 36 "
Stroke of both..... 48 "
Highest speed attained per minute. 60 revolutions.
Cubic feet air discharged per min. 13,000
Greatest power developed..... 700 HORSES.
Working duty of engine..... 40 revolutions.
Cubic feet air per minute at working duty..... 9,000 inches.

A large cotton press with new improvements is being made at the Scott Foundry of the Reading Iron Company for a Southern party.

The Crowther Furnace at New Castle has been blown in.

A new iron ore mine will be opened on the premises of Lewis S. Lichtenwallner, in Longswamp township. The necessary machinery is being erected by the Allentown Iron Company, which will operate the mine.

Messrs. Gilham & Fisher, Reading, manufacturers of the Champion Refrigerators, have completed a large and handsome refrigerator car, similar to those heretofore manufactured by Frederick Laurer, which was sent on Tuesday of last week to Bergner & Engel, of Philadelphia.

PITTSBURGH AND VICINITY.

The Hoop Mills of Lindsay & McCutcheon, Allegheny City, are running double turn.

Messrs. Ritter & Conley, Pittsburgh, have commenced the construction of a 25,000-gallon-iron oil tank, to be located at Oil City. Kier Bros., Pittsburgh, manufacturers of "Salina" fire-brick, are running their works full time and are receiving a good demand for their brick.

Messrs. John B. Harker & Co., Pittsburgh, manufacturers of annealed stove ware, are lately in receipt of some very large orders from St. Louis, compelling them to run their factory double turn for the last two weeks.

The parties in Cincinnati who had been buying inferior glassware and branding it as the product of Wm. McCully & Co., glass manufacturers of Pittsburgh, have been enjoined from doing so in the future, and a commission has been appointed to estimate the profits obtained from the ware thus falsely branded, which are to be paid to McCully & Co. as damages.

Messrs. Gillepie Bros. & Co., Pittsburgh, manufacturers of oil well supplies and iron and steel forgings, are now employing about 50 men, and are running their works from 7 o'clock in the morning until 6 o'clock at night, and with good prospects for the summer. They received last week some very large orders from the West and South, necessitating the employment of a larger force of men. They have lately commenced to manufacture a patent wood workers' rasp or float, which is considered the best tool of the kind for reducing soft metals and hard woods. They have just received from a Western firm an order for 5000 of these rasps, and are now putting in special machinery for their manufacture.

OHIO.

The *Independent* says the Russia and Niles Iron Companies' mills are running steady, with plenty of orders ahead.

The Enterprise Glass Works at Ravenna make 50,000 lamp chimneys per week.

It is reported that the keeper of the Lowell Furnace has received orders to get it in readiness to blow in. It has been idle between four and five years.

Work has been commenced on a large building at Geneva which, when completed, will be used for the manufacture of all kinds of locks and door and window trimmings.

A new company has just been organized at Youngstown for the manufacture of cotton ties. It is called the United States Iron Company, and it has the right to use Flinn and Weir's patent buckle. The building is nearly finished, and arrangements are about completed for doing a very large business.

On Saturday, the 24th ult., Brown, Bonnell & Co., Youngstown, sent to each of their puddlers a letter, of which the following is a copy:

YOUNGSTOWN, May 25, 1878.

DEAR SIR: On the 1st day of June next we will stop the puddling department of our works, and will not start again until there is some inducement offered for us to do so. We do not, therefore, require your services after that date, and will settle your account in full on our next regular pay day (June 8th). We regret very much that we are compelled to pursue this course, as our relations with you have always been very pleasant.

Respectfully yours,

BROWN, BONNELL & CO.
The Lake Erie, Alliance & Wheeling Railroad has been sold to the Cleveland Rolling Mill Company.

The cotton-tie mill recently added to the Youngstown Rolling Mill is in operation.

WISCONSIN.

Filer, Stowell & Co., of the Cream City Iron Works, Milwaukee, are making shipments of machinery to J. F. Colord, at Jessup, Georgia.

MISSOURI.

The Missouri Car and Foundry Company, of St. Louis, have just finished 25 Tiffany refrigerator cars for the Anheuser Brewing Company, and to circus cars for Cole & Co. They are now building 260 box cars for the Chicago and Alton, and have contracted to build 200 box cars for the Missouri River, Fort Scott and Gulf, 100 for the Kansas City, St. Joseph and Council Bluffs, and 100 for the Receiver of the Chicago, Pekin and Southwestern railway. They have also four narrow-gauge passenger cars under way, and bals awaiting decision for several hundred more cars.

INDIANA.

The machine shops of the Indianapolis, Peru and Chicago Railway at Peru were struck by lightning on the night of the 29th ult., and with the contents were burned. The loss is estimated at \$100,000. No insurance.

KENTUCKY.

Mr. J. A. Hall is about to build at the Eagle Flow Works in East Maysville, a large brick warehouse similar to the one constructed on the same lot several years ago.

MICHIGAN.

The plate mill at Wyandotte started up on Monday morning, the 27th ult. It is working on a large specification of tank iron from the Paris Exposition.

ALABAMA.

Copper Hill Mining Company have a paying property in Claiborne County, 30 miles from Oxford, on Selma, Rome and Dalton Railroad, and 28 miles from a branch of the West Point road. The company have heretofore shipped their matte to Baltimore, but that policy will now be abandoned, as they are preparing to do their own refining, and will hold what matte they make until the necessary additional plant shall be completed.

There are now in operation three reverberatory furnaces and one blast furnace. They will push to completion a blister furnace and a refiner, and will have them in operation by Sept. 1. The ore is the same as that worked at Ducktown, Tennessee, this company, however, operating but one vein, a yellow sulphur from 23 to 30 feet thick, and yielding about 7½ per cent. of refined copper.

TENNESSEE.

The Leadville Lead Works are situated at a landing of that name on French Broad River, 40 miles north-east of Knoxville, in Sevier county. The company who first began working the mine being short of capital, pursued the policy of smelting what ore they could readily and cheaply come at and making the proceeds pay expenses of development. This plan did fairly for a couple of years, when the company fell out and went to court to settle the dispute. Then a receiver was appointed, and for two years last the work has been in charge of two different receivers. One reverberatory and one slag furnace are now in operation, and are producing excellent lead, made entirely from low grade ore—about 60 per cent. and occasional lumps of galena found in the outcrop. No considerable pocket has yet been found, nor has a regular vein been reached, though boulders of galena have been taken out, weighing from 1000 to 3000 pounds, which yield from 84 to 92 per cent. of fine metal. The shaft is now 80 feet deep, and the prospects that a regular vein or a large pocket will be found are excellent. The receiver is now making 1500 pounds of refined lead daily, for which he finds market at Chattanooga, Knoxville and other convenient points. Leadville is within easy reach of Knoxville by water the year round, light draft boats being able to run to that point at low water.

MICHIGAN.

The Griffin Car Wheel Company of Detroit are running their foundry to its full capacity on wheels and other castings.

The Michigan Car Company are turning out 10 cars per day and are casting 200 wheels and about 25 tons of car castings daily in their foundry.

The Detroit Iron and Brass Works have plenty of orders and are running to their full capacity on hollow-ware.

American Representation and the International Jury.

The United States will be represented on the International Jury of the Exhibition by 37 members, a larger number than Commissioner-General McCormick expected to secure. The French authorities promise no salary or allowance for expenses to the jurors, and require them to be in attendance from early in June to the 1st of September.

The following selections have been made: Classes 1 and 2, oil paintings and various paintings and drawings, Frank D. Millet; class 5, engravings and lithographs, Joseph K. Riggs; class 7, organization and appliances for secondary instruction, John D. Philbrick; class 9, printing and books, Henry Stevens; class 10, stationery and bookbinding, painting and drawing materials, Charles C. Fulton; class 12, photographic proofs and apparatus, Joseph Tuckerman; class 13, musical instruments, Fred H. Post; class 14, medicines and hygiene and public relief, Dr. Thomas W. Evans; class 26, clocks and watches, Colonel Thomas W. Knox; class 40, portable weapons and hunting and shooting equipments, General Van Allen; class 43, mining and metallurgy, Professors W. P. Blake and H. B. Nason; class 46, agricultural products not used for food, Ashbel Smith; class 47, chemical and pharmaceutical products, Professor W. H. Chandler; class 49, leather and skins, A. H. Reitlinger; class 51, agricultural implements, F. C. Johnson; class 59, apparatus and processes used in manufacturing furniture and articles for dwellings, A. G. Wilkinson; class 66, civil engineering, T. E. Sickels; class 68, materials and apparatus for building purposes, General W. W. H. Davis; class 69, cereals and farinaceous products, Dr. Wm. E. Johnston; class 75, fermented drinks, Dr. Antoine Ruppaner; class 76, farm buildings and agricultural works, Edward H. Knight, class 17, cheap and fancy furniture, Thomas B. Oakley; class 24, goldsmiths' and silversmiths' work, George T. Bourne; class 27, apparatus and processes for heating and lighting, Harry S. Homans; class 38, clothing for both sexes, James W. Tucker; class 54, machines and apparatus in general, Professor George Davidson, Thomas James Sloan, and B. B. Hotchkiss; class 55, machine tools, B. B. Hotchkiss and Charles R. Godwin; class 58, apparatus and processes for sewing and making clothing, Isaac H. Burch; class 62, carriages and wheelwrights' work, John Munroe; class 64, railway apparatus, Theodore Bronson, and class 72, meats and fish, George Wurts.

The Baldwin Locomotives in Europe.—A German paper says: A number of American machinists have been working lately in Eydtkuhnen, Prussia, putting together the locomotives which the Russian

government bought in America, and which have recently arrived. The railway station at Eydtkuhnen looks like an enormous storage place for engines, rails and other ironware. The American workmen, who are surrounded by observant crowds while at work, are truly remarkable for their aptness and skill, and particularly for their wonderful cleverness in handling tools. With the exception of the engineer in charge, they speak only English, and it is very laughable to hear the jaw-breaking that goes on between them and the German workmen.

Special Notices.

SPECIAL NOTICE.

The undersigned offer their services as agents to

American Producers of Metals.

They represent foreign brands of

Zinc, Russia Iron, Hoop Iron, Window Glass, Cutlery and Guns.

LOUIS WINDMULLER & ROELKER,

20 Reade Street, N. Y.

Special Notices.

JENNINGS'S

COMBINATION DISCOUNT TABLES.

(Published by the author.)

This Book contains 1500 tables for single and combination discounts, such as 17½%, 45%, 10&½%, 15&½%, 25%, 33½%, 50&½%, 62½%, 45&½%, 10&½%, 60&½%, 10&½%, 65&½%, 10&½%, 75%, 15%, &c., &c., which are so arranged as to be found without loss of time, and by their use either the Discount or Net value of any article can be ascertained in a few seconds entirely by Addition. Just the thing for making or proving invoices, finding Net Value of goods bought or sold, and comparing different Discounts, thereby saving time, blunders and Headwork.

(A copy can be examined in "The Iron Age" Exhibit at the Paris Exposition).

OPINIONS.

TOLEDO, O., April 15, 1878.
Mr. S. H. Jennings: DEAR SIR.—Your Discount Tables are received, and I think are all you want for them. I will apply them to the trade, and have had inquiries from customers for something of the kind, and shall be pleased hereafter to recommend your book. Yours, very truly,

T. W. ROOT,
with the Russell & Erwin Co.,

MILDALE, CONN., March 20, 1878.
We consider it a great help, and a book which every business house should possess.

CLARK BROS. & CO.

HOUSTON, TEXAS, April 8, 1878.
We find it saves a great deal of figuring.

DECHAUMES & DUNN,

HOT SPRINGS, ARK., April 15, 1878.
We find the Tables correct, and are highly pleased with it. Every merchant should have one of them.

JONES BROS. & CO.,
Hardware Merchants.

It will be mailed, postpaid, to any address, on receipt of the price, \$3. Currency may be sent by mail at my risk. Address

S. H. JENNINGS,

Deep River, Conn.

S. H. JENNINGS,

Deep River, Conn., U. S. A.,

Offers his services to parties in any

FOREIGN COUNTRY

except Great Britain, who may desire to establish, build up, or increase a trade in **American Hardware, Agricultural Implements, Machinery, and Miscellaneous Goods**, as

EXPORT FACTOR,

at a low rate of commission. Correspondence solicited. He has had three years' experience as Purchasing Agent for

Messrs. WM. MARPLES & SONS,

Sheffield and London, England,

Jobbers doing business throughout Great Britain, and to whom he would with pleasure refer. By arrangement with them he will represent no other firm having a house or branch house in Great Britain, which includes England, Ireland, Scotland and Wales. He buys direct from manufacturers, and only for **export**, thus securing lowest possible prices. He will attend all meetings of the **Manufacturers' Association** and **Chamber of Commerce**, and **Shippers' Association**, and has facilities in New York City for securing prompt shipments at most favorable rates of freight. Manufacturers of goods suitable for Foreign Trade are invited to send in their catalogues or catalogues, and quote "hard pan" prices for export, which will be considered confidential.

W. M. CALDWELL,

Dealer in

Job and Auction Lots of Hardware, Cutlery, &c.,

102 Chambers St., New York.

Special Notices.

W. GARNER,

General Merchant,

Mouldsworth, near Chester, England,

Supplies nearly every class of Goods,

including all kinds of

Agricultural Machinery, Domestic Machines,

SEWING MACHINES

And Artificial Manures.

W. GARNER is open to represent any Foreign Manufacturers in England for the sale of their manufactures of whatever nature or kind. Having a wide and well established connection in the Provinces, could introduce some American, German and French products to mutual advantage.

W. GARNER is also open to buy any kind of Goods on commission, and ship them to any part of the world. Manufacturers or others desiring his assistance will please address (with full particulars in English) as above.

AUSTRALIA.

AMERICAN HARDWARE CO.,
No. 9 WILLIAM STREET, MELBOURNE,
AUSTRALIA.

Solicits correspondence with American manufacturers desirous of representation in the Australian Colonies. Consignments will have prompt attention. References furnished.

To Manufacturers and Jobbers of Hardware, Cutlery, &c.

Manufacturers and Jobbers, having surplus stocks or goods that from any cause are unsaleable upon which they wish to realize, or assignees who have stocks to dispose of, will find a cash purchaser by communicating with

Trade Report.

Office of THE IRON AGE.

WEDNESDAY EVENING, June 5, 1878.

The debt statement for May shows a gain of nearly \$34,000,000 in the amount of coin held by the Treasury over the amount shown in the April statement. This amount was obtained from the sale of 4½ and 4 per cent. bonds. Deducting from the aggregate of coin in the treasury \$53,000,000 for coin certificates and \$10,000,000 held to redeem called bonds and meet coin demand and obligations, there remains in the Treasury, against which there are no demands, \$126,471,757. Of this amount \$6,423,333 are standard silver dollars and \$6,169,376 subsidiary silver coins. Deducting the last item, we have a balance available for purposes of redemption of over \$120,000,000.

During the month of May there was no reduction in the amount of legal tenders outstanding. This is the first time in many years that the debt statement has not shown a reduction in legal tenders when a reduction was shown in the public debt for the month. The amount of legal tenders outstanding yesterday was \$346,681,016. Under the act to forbid the further retirement of legal tenders, recently approved by the President, the amount named above becomes the minimum of the outstanding legal tender circulation. This amount is nearly \$3,000,000 in excess of the sum outstanding prior to the issues of the \$44,000,000 reserve immediately following the panic of 1873. The customs receipts for May were \$9,716,580, and the internal revenue receipts \$12,350,341. Compared with May, 1877, these figures show a decrease in customs receipts of over \$1,000,000, and in internal revenue an increase of over \$800,000.

During the twelve months ending April 30th the value of domestic exports was over \$681,000,000, an increase over the twelve months ending April 30, 1877, of more than \$78,000,000. The value of foreign imports for the twelve months ending April 30 was nearly \$459,000,000, an increase of nearly \$30,000,000 compared with the preceding twelve months.

What to do with the silver dollars is a problem which is likely to give the Treasury officials some difficulty. An effort is about to be made to put in circulation the six millions of these coins on hand; and as it has been denied that the department has authority to pay transportation charges from mints and sub-treasuries, the plan of distributing them to widely-separated points will be tried. Official advices from California report that the new silver dollar is treated as a subsidiary silver coin, and that there is no demand whatever for it. The banks there refuse the new dollars except as a special deposit. The coining of the new dollar has been practically stopped at the San Francisco and Carson City mints, the supply on hand being largely in excess of the demand. The amount of bullion on hand at both mints is very small. It is regarded as significant that the owners of the bonanza mines refuse to sell the Government bullion except for gold. No purchases have, therefore, been made.

During May 3,500,000 silver dollars were coined at the various mints. Most of the mints will suspend work for about 30 days on the 15th of the present month, in order to make up their annual settlement and repair machinery.

During the past week the local money market has been easy at 2½ @ 3½ % on call and 3½ @ 4½ % on prime business paper.

The gold premium has again declined to 100½, and the market is without important feature. The following table shows the daily range of the premium.

Highest. Lowest.

Thursday	101½	100½
Friday	101½	100½
Monday	100½	100½
Tuesday	100½	100½
Wednesday	100½	100½

Government bond market is quiet and strong. During the week the Syndicate subscribed for the remaining \$15,000,000 of United States 4½ % bonds, thereby completing their contract for \$50,000,000 made on April 11. All of these bonds which are destined for this market had been sold ahead of their receipt by the Syndicate from the Treasury. Below we give the closing quotations of governments. Railroad bonds are strong at generally better prices.

The stock market is fairly active, with an advance early in the week and a subsequent decline. The principal dealings have been in North-West, Lake Shore, D. L. & W., St. Paul, Western Union, Rock Island and N. J. Central. Below we give the closing quotations of active shares.

The last weekly bank statement shows the large gain of \$3,224,100 in the legal-tender note average, and a loss in the specie average of \$2,825,900. The resulting difference is a gain of \$398,200 in the total reserve. On account of the increase in deposit liabilities the surplus reserve (now \$14,282,225) is increased only \$177,550. The following is a comparison of the bank averages for the last two weeks:

May 25.	June 1.	Differences.
Loans.....	\$33,997,200	\$24,049,400
Specie.....	19,827,100	17,001,200
Legal-tender.....	44,023,900	47,248,000
Deposits.....	198,985,300	199,887,900
Circulation.....	20,005,000	19,941,000
		Dec. 24,800

The following tables show the foreign trade movements for the week:

IMPORTS.		
For week ended June 1:		
1876.	1877.	1878.
Total for week.	\$4,057,668	\$6,340,376
Prev. reported.	133,277,545	135,612,325
Since Jan. 1.	1,373,521	1,141,932,701
		\$122,500,000

Included in the imports of general merchandise were articles valued as follows:

Quantity.	Value
Anvils.....	100
Brass goods.....	6,151
Bronzes.....	8
Chains and anchors.....	5,770
Copper.....	4,033
Cutterly.....	50
Gum fixtures.....	2
Guns.....	10
Hardware.....	24
Iron, pig, tons.....	450
Iron ore, tons.....	545
Iron, other, tons.....	248
Metal goods.....	83
Nails.....	148
Plates.....	10,020
Old Metal.....	1,351
Plating.....	1,021
Plated ware.....	1
Per caps.....	9
Saddlery.....	28
Steel.....	3,275
Silverware.....	304
Tin, boxs.....	10,650
Tin, 22 slabs.....	35,177
Wire.....	173

EXPORTS, EXCLUSIVE OF SPECIE.

For week ended June 4:		
1876.	1877.	1878.
Total for the week.	\$5,574,347	\$6,251,533
Prev. reported.	95,779,505	106,699,603

Since Jan. 1.... \$102,373,852 \$112,021,734 \$145,507,158

EXPORTS OF SPECIE.

For week ended June 1:		
Total for the week.	\$172,623	7,801,576

Previously reported.

Total since Jan. 1, 1878:	\$7,973,190
Same time in 1877.	15,460,274
Same time in 1876.	25,127,750
Same time in 1875.	37,585,767
Same time in 1874.	33,490,665
Same time in 1873.	40,219,400
Same time in 1872.	26,717,261

Government bonds at the close were quoted as follows:

Bid.	Asked.
U. S. Currency 6's.....	101½
U. S. 6's 1881 registered.....	105½
U. S. 6's 1865 new reg.....	101½
U. S. 6's 1865 cou.....	104½
U. S. 6's 1867 cou.....	104½
U. S. 6's 1868 reg.....	106½
U. S. 6's 1868 cou.....	109½
U. S. 10-40 reg.....	107½
U. S. 10-40 coupon.....	107½
U. S. 1881 registered.....	105½
U. S. 5's 1881 coupon.....	105½
U. S. 4½ 8 1881 registered.....	103½
U. S. 4½ 1881 registered.....	103½
U. S. 4½ 1881 registered.....	103½
Central Gold Bonds.....	108

The following were the closing quotations of active shares:

Atlantic and Pacific Telegraph.....	24½
Chicago and Northwest.....	53½
Chicago, Rock Island and Pacific.....	115½
Chicago, Bur. and Quincy.....	105½
Col., Chicago and Ind. Central.....	4
Clev., Col., Cin. and Ind.....	28
Cleveland and Pittsburgh.....	83½
Chicago and Alton.....	80½
Canton.....	204
Delaware, Lack. and Western.....	36½
Delaware and Hudson Canal.....	56½
Express—Adams.....	103
" American.....	49½
" United States.....	49½
" Wells, Fargo & Co.....	94
Erie.....	16½
Harlem.....	33½
Hammond and St. Joseph.....	11
Illinois Central.....	83½
Kansas Pacific.....	7½
Lake Shore.....	63½
Michigan Central.....	68½
Morris and Essex.....	86
Milwaukee and St. Paul.....	53
Mariposa.....	3
New York Central.....	110½
New Jersey Central.....	30½
Ohio and Mississippi.....	9
Pacific Mail.....	10½
Pittsburgh and Fort Wayne.....	97
Quick Silver.....	15½
St. Louis and Iron Mountain.....	5½
St. Louis Kansas City Northern.....	4½
Toledo, Wabash and Western.....	15½
Union Pacific.....	60½
Western Union Telegraph.....	84½

GENERAL HARDWARE.

We are authorized by the American Screw Company to make the important announcement that they have in contemplation the sale of a large accumulated stock of Screws at public auction. This announcement will no doubt cause much surprise in the trade, chiefly because the company's policy in this matter involves a radical departure from the usages of the Hardware trade. Probably it will excite some apprehension of a demoralizing break in prices, but experience in the sale at auction of other lines of manufactured goods, both standard and novelties, seem to show that it often has just the opposite effect from that which at first glance might seem inevitable. The American Screw Company are induced in this matter largely by the results of the very large sale of domestic dry goods on the 29th ult., as well as those of Goddard Bros.' Lonsdale goods and Richmond Co. prints. These sales were followed by an improvement in the general tone of the market and an increased firmness in prices, growing out of the fact that the market was relieved of the incubus of surplus stocks in manufacturers' hands. Prices obtained at the sales were a fair indication of the state of the market and the requirements of the distributing trade, and enabled manufacturers to determine how to adapt their production to the demands of consumption. Equally satisfactory results have also been secured by auction sales in the imported dry goods, coal, tea, rubber and many other trades, in which they have become very popular. Whether like results will attend the effort to apply this method of distributing stocks to the Hardware trade can only be determined by experience. It has been found in other lines that, under

favorable conditions, standard goods command their value when sold by the crier in the auction room quite as readily as when offered at private sale, and often the auction bids determine values when the manufacturer and dealer have no means of finding out what goods are worth to the trade. The experiment of an auction sale of Screws will certainly be an interesting one, and it will be awaited with much interest by all concerned. Considering the fact that it is a radical innovation upon the established methods of business in this line, it certainly merits full and intelligent discussion, and we will gladly give space in our columns to those in the trade who may have any views on the subject which they desire to present to our readers. We print on page 14 an editorial on this subject, to which attention is invited.

We mentioned last week the apparent tendency toward lower prices for Loose Pin and Loose Joint Cast Butts. The market seems to be very much demoralized, and Cast Butts are being offered at various prices, all below any printed quotations that we have seen. We hear of sales

us from London to the 25th ult. to the following effect: "Telegrams from Chili announce small charters, and this has caused more firmness; but English can still be had without difficulty at £63 for Tough Ingots, £69 for Best Selected and £72 for Sheets." With moderate demand the combination prices of Manufactured Copper remain as last quoted. There is scarcely any inquiry for English Yellow Sheathing Metal, and the price is nominally 14¢, currency, in bond. American is somewhat irregular, and quoted at 18¢ at 20¢, although some sales are understood to have been made under the inside price. We quote: New Sheathing Copper, 26¢; Braziers', 28¢, and Bolts, 28¢; American Yellow Sheathing Metal, 18¢ at 20¢; Yellow Metal Bolts, 25¢, and English Yellow Sheathing Metal, 14¢, currency, in bond.

Tin.—There is no change in price since our last. We quote large lines, in gold, as follows: Straits, 14 1/2¢ @ 14 1/2¢; English Refined, 14 1/2¢ @ 14 1/2¢; ditto Common, 14 1/2¢ @ 14 1/2¢; and Banca, 17 1/2¢ @ 17 1/2¢. About 2000 slabs were sold here last month at 14 1/2¢, gold, July delivery. Further parcels are offered at the same price, but find no buyers. The Singapore market is unchanged, but London cables £63. The shipments from the Straits to the United States in May have been ample—say, 4500 tons. Australia continues to send large quantities. The May shipments thence to England were 1000 tons. The stock in London on the 1st inst. (as per cable) was 9800 tons, an increase of 600 tons since May 1st. The deliveries in England and Holland in May, the cable further informs us, have been 1900 tons. There are afloat for the United States from the Straits settlements to-day some 15,000 slabs. **Tin Plates** evince great firmness, and a fair amount of business is transacting all along. As per cablegrams from Wales, the market there is irregular, some needy makers accepting lower figures, while the financially independent ones only sell at higher ones, as the case may be. We quote at the close in gold, per box, ordinary brands, large lines as follows: Charcoal Bright, £6.12 1/2¢ @ £6.25; Charcoal Ternes, £5.62 1/2¢ @ £5.75; Coke Tin, 5¢ @ £5.25, and Coke Ternes, £4.87 1/2¢ @ £5. From Liverpool we receive the following, dated May 23: "Last Friday it was announced that the makers' combination to reduce production was accomplished. Since, however, it appears there are some formalities to be gone through, which cause uncertainty. There has been, however, a decided improvement in tone, and in some cases an advance of 1¢ per box is asked, but so far has not been paid. Other makers are holding off from quoting, being pretty well booked. We quote: Charcoal Tins, 17 1/2¢ @ 19¢; Ternes, 16 1/2¢ @ 16 1/2¢; Coke Tins, 15 1/2¢ @ 17 1/2¢; Ternes, 16 1/2¢ @ 16 1/2¢; Coke Tins, 15 1/2¢ @ 17 1/2¢; Ternes, 14 1/2¢."

Lead.—Some smaller sales of Newark Lead have been made at 3.20¢, currency; for larger lots of Common Domestic it would not be easy to get 3 1/2¢, currency, at the present moment. Inquiries have been made from Europe whether Common American Lead can be had at 3¢, currency, but as a negative answer had to be wired, nothing further has been heard. At all events, this is a sign that our low prices begin to attract attention on the other side. The next question will be whether prices in Europe would not be most unfavorably affected should shipments hence be made with some prospect of continuity. We should not trouble ourselves much about this contingency. The consumption of Lead in Europe is very large, and the 10,000 tons which we may possibly ship thither between July 1 and January 1 will in reality make little difference whether they come from there or from Spain, where there is a temporarily diminished output. At first the impression may not be a favorable one, but they will soon reconcile themselves to a certain amount of annual supply from here, and the sooner they do so the better, for Lead is destined to become a great export article of ours. Whoever has followed developments in Lead production in this country ought to be satisfied on the subject by this time. We receive the following from England by the last mail: "The depression in Lead continues, and we quote good soft English Pig, £16. 15¢; Sheet, £18. 5¢; Pipe, £18. 10¢, less 3 1/2¢ free on board; soft Spanish, without silver, £16. 10¢, less 2 1/2¢ ex quay." Manufactured is taken to a moderate extent at the combination prices, which are slightly lower. We quote: Bar, 4 1/2¢; Pipe, 5¢; Sheet, 6¢; Tin-lined Pipe, 15¢; No. 1 Solder, 8 1/2¢; all less 10¢ to the trade.

Selter and Zinc.—But a moderate business is transacting in this metal, which we quote 4 1/2¢ @ 5¢, currency, for Common Domestic Selter. Nothing of special interest has been received about it from Europe, except that it lacks strength on the Continent since the late fresh decline in England. **Sheet Zinc.**—There is a moderate demand for Sheet, but trade remains rather dull and prices more or less nominal. We quote: Moussemann, 7 1/2¢ @ 7 1/2¢, gold, and Domestic, 6 1/2¢ @ 6 1/2¢, currency.

Nickel.—As per late mail accounts from England, this metal has now become quite steady there, and so it is here, where we quote it as heretofore, \$1.30, currency, per lb.

Antimony.—Cookson is scarce, but inactive at 13¢, gold; Hallet and others, 12 1/2¢, gold. The quotation for best at London is £51.

OLD METALS, PAPER STOCK, ETC.
Business in this market is still laboring under a season of dullness. There is no demand for any class of stocks, and prices are still declining.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	per lb.	\$0.10 1/2 @
Copper Bottoms	per lb.	\$0.10 1/2 @
Yellow Metal	per lb.	\$0.10 1/2 @
Brass, heavy	per lb.	\$0.09 1/2 @
Brass, light	per lb.	\$0.08 1/2 @
Composition, heavy	per lb.	\$0.08 1/2 @
Lead, solid	per lb.	\$0.08 1/2 @
Tea Lead	per lb.	\$0.08 1/2 @
Zinc	per lb.	\$0.08 1/2 @
Pewter, No. 1	per lb.	\$0.09
Pewter, No. 2	per lb.	\$0.07
Wrought Iron	prton. \$16.00	per lb.
Light'd	per lb.	9.00
Stove Plate	per lb.	9.00
Machinery do.	per lb.	10.00
Grate Bars	per lb.	3.50

The prices current for Rags, &c., are as follows:

Canvas, Linen	per lb.	3 c. @ 3 1/2¢
" Cotton, No. 1	per lb.	3 c. @ 3 1/2¢
White, No. 1	per lb.	4 1/2¢ @ 6 c.
" No. 2	per lb.	2 1/2¢ @ 3 c.
Seconds	per lb.	2 c. @ 3 c.
Mixed, Woolen	per lb.	2 c. @ 3 c.
Soft, do.	per lb.	5 1/2¢ @ 6 c.
Gunny bagging	per lb.	3 c. @ 3 c.
Kentucky bagging	per lb.	3 c. @ 3 c.
Waste Stock	per lb.	1 1/2¢ @ 1 1/2¢
Waste Paper and Scraps	per lb.	1 1/2¢ @ 1 1/2¢
Kentucky Bale Rope	per lb.	4 c. @ 5 c.
Oakum Junk, No. 1	per lb.	4 1/2¢ @ 5 c.
" No. 2	per lb.	3 c. @ 3 c.
Tarred Shaking	per lb.	1 c. @ 1 1/2¢
Grass Rope	per lb.	1 1/2¢ @ 2 1/2¢

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending June 4, 1878.

Hamburg.		Quan.	Value.
Arms, cs.	5	\$875	
Hdw., cs.	140	4,493	
Spelter, slabs	1758	5,400	
Wringers, bx.	55	5,591	
Lea. belt, cs.	2	265	
Ag. imp., pkgs	16	8,095	
Copper, bbls.	90	19,000	
Sew. mach., cs.	54	5,052	
Ag. mtl., pkgs	5	105	
Mf. iron, pkgs	50	601	

Bremen.		Quan.	Value.
Mach'y, cs.	8	435	
Hdw., cs.	23	804	
Copper, cks.	9	1,025	
Belted, hds.	2	200	
Ag. imp., pkgs	213	6,765	

Dutch West Indies.		Quan.	Value.
Revolvers, bx.	1	100	
Hdw., cs.	250	250	
Nails, kegs.	15	44	
Ag. imp., pkgs	4	474	

London.		Quan.	Value.
Mach'y, cs.	5	300	
Liverpool.			
Ag. imp., pkgs	86	3,310	
Hdw., cs.	13	250	
Iron rolls, cs.	1	140	
Mach'y, cs.	9	2,920	

British North American Colonies.		Quan.	Value.
Coal, tons	360	1,250	
Tin, pkgs	100	1,027	
Mf. iron, pkgs	4	177	

British Possessions in Africa.		Quan.	Value.
Mf. iron, pkgs	44	485	
Hdw., cs.	42	1,190	

British West Indies.		Quan.	Value.
Coal, tons	360	1,250	
Tin, pkgs	100	1,027	
Mf. iron, pkgs	4	177	

British Australia.		Quan.	Value.
Hdw., cs.	42	8,737	
Ag. imp., pkgs	432	11,000	
Wringers, pgs	5	114	
Mf. iron, pkgs	35	1,027	

Argentina.		Quan.	Value.
Tin, pkgs	35	1,027	
Mf. iron, pkgs	4	177	
Cge mtl., pkgs	17	3,722	
Pit'd ware, cs.	13	1,560	
Sawd., cs.	5	332	
Sew. mach., cs.	42	3,000	
Tinware, cs.	7	180	

British Honduras.		Quan.	Value.

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I venture to say, the very sincere desire of many a long-suffering and patient British ironmaster.

YOUR TARIFF BILL

has almost ceased to attract more than the most casual attention here, the majority of people having pretty well made up their minds that the measure will be lost, or, if it passes, that it will only do so in a maimed and mutilated shape. The subject of American competition, however, continues to be written about in the newspapers and the leading trade journals. Among others the *Ironmonger* (now published weekly) this week has an editorial setting forth statistics ayeant your export progress, and exhorting the Britishers to stir themselves up and by adopting or using various specified resources meet you "squarely face to face."

BELGIAN COMPETITION

is also dealt with in the same quarter, in relation to the statistics recently furnished by the Belgian government. The Foreign Office have received a report of Belgian progress from M. J. Saville Lumley, who is attached to our embassy at Brussels, in the course of which that gentleman appears to be of opinion that the marked metallurgical progress of that nation is in great part owing to the long working hours and the vigorous manner in which strikes are repressed by the civic and military authorities.

SCOTCH PIG IRON

has further declined in price during the week, both as regards warrants and makers' brands. Shipments to date still show a decline for the year, and stocks are proportionately heavier both in warehouses (174,827 tons) and makers' yards.

Writing from Glasgow May 28, James Watson & Co. reported: "The Scotch pig iron market has been depressed this week with a restricted business doing. The market opened this week firm at 40/6, advanced to 49/7, cash, and 49/9 one month, closing sellers on Monday afternoon at 49/6½ per ton. On Tuesday the price declined from 49/6 to 49/4½, a fair business having been transacted. On Wednesday it further dropped from 49/4½ to 49/3, cash, and yesterday as low as 49/1½ was accepted, improving however in the afternoon to 49/2½ per ton. To-day the market opened firmer, business being done at 49/3 and 49/3½, cash, closing quietly in the afternoon at 49/3 per ton. Shipments last week were 9348 tons, against 12,392 tons in the corresponding week of 1877." We quote:

No. 1.	No. 3.
G. M. B., at Glasgow.....	49/9 48/6
Gartsherrie, "	57/6 53/9
Collness, "	60/6 54/6
Summerlee, "	57/ 50/9
Langloan, "	58/ 53/6
Carnbroe, "	51/6 50/
Caledon at Port Dundas.....	56/6 49/9
Gretna, at Ardrossan.....	56/6 51/6
St. R. Eginton, "	56/6 49/6
Dalmellington, "	56/6 49/6
Knotts, at Leith, "	58/6 55/6
Kinnel, at Bo'ness.....	54/6 51/

Shipments from the Clyde are on an average scale, and last week included: From Glasgow.—Calcutta—2 tons malleable iron tubes, £21; 5½ tons rivets, £62; machinery, £252; 6½ tons iron castings, £798; sewing machines, £98. Quebec and Montreal—22½ tons boiler plates, £192; 20½ tons wrought-iron boiler tubes, £151; machinery, £218; 28½ tons malleable iron, £170; 97 tons bar iron, £618; ¾ ton sheet iron, £9; 11½ tons iron castings, £105. Rouen—Machinery, £870; sewing machines, £935; 10½ tons wrought-iron tubes, £205. Berbice—Sugar-making machinery, £925; ¾ ton bar iron, £10. Brisbane—92½ tons iron castings, £1112; sewing machines, £72; 9 tons galvanized iron, £173; 24 tons wrought-iron tubes, £200; 15 tons bar and plate iron, £250. Huvelva—41 tons bar iron, £335; 30½ tons sheet iron, £246; 2½ tons hoop iron, £35; 5½ tons iron castings, £101; iron and steel manufactures, £15; 1½ tons rivets, £38; ½ ton wrought iron, £10. Singapore and Penang—Boiler fittings, £220; 11 tons iron castings, £660; anchors and chains, £200; ¾ ton galvanized hoop iron, £15; 10½ tons galvanized iron, £182; 564½ tons bar iron, £386. Callao—12½ tons castings, £118; steam machinery, £375. Bordeaux—6½ tons wrought-iron tubes, £130; sewing machines, £1330. Dunkirk—24½ tons wrought-iron tubes, £495; agricultural machinery, £90. Havre—iron castings, £4; 7½ tons wrought-iron tubes, £140. The amount of manufactured iron exported from Glasgow last week was: Bar, 713½ tons; hoop, 3½ tons; malleable, 30½ tons; plate, 27½ tons; sheet, 31½ tons; wrought, 92½ tons. From Greenock.—St. Johns, N. F.—Wrought iron, £33; iron pipes, £3; cast iron, £60; galvanized iron, £3. Trinidad—Bar iron, £36; iron hoops, £45; iron wire, £9; iron nails, £18. From Grangemouth.—Amsterdam (via Leith)—Sewing machines, £310; 1½ tons cast-iron pipes, £111. Rotterdam—2 tons iron castings, £20.

THE LANCSHIRE RIOTS

of the past week, of which you will have had full details by cable, have excited an exceedingly painful interest throughout the country, and, in a certain sense, some alarm. Those who have but superficially looked into the matter have endeavored to attribute the disturbances to political causes by inferentially arguing that the policy of force has of late usurped the sway of opinion in the councils of the nation. It seems clear to me, however, that the disruption is solely and entirely owing to the long continuance of low wages and short time, and to the fact that the influence of the men has been so thoroughly neutralized by the depressed tendencies of the times. Add to this the fact that there are in all large towns a number of unruly roughs, and we have ample component parts for riotous and disorderly proceedings.

THE SHEFFIELD TRADES

are quiet in respect of iron, steady as to hardware and cutlery, fairly busy as regards Bessemer and rails made thereof, progressing in Siemens steel, and extremely quiet in all branches save one of the ordinary crucible steel industry—the exception being the works where large castings for ordnance are produced. In some little elaboration of this epitome I may say that all classes of iron ores and other raw materials are plentiful as to supply and weak in price. The ones used in the locality are, as

heretofore, those from the North Lincolnshire, Mid-Lincolnshire and Northamptonshire fields, in using up which some of the larger smelters of Derbyshire and South Yorkshire mix some of their own local blackband ironstone. This latter stone is getting somewhat attenuated here and there, but there is still a goodly quantity at Butterley, Denby, Thorncleif, Sheepbridge, Renishaw, Staveley and Elsecar, besides some in the hands of the Fitzwilliam family.

The working of the North Lincolnshire district is very largely controlled by South and West Yorkshire houses—such as Dawes, of Elsecar—and those in Mid-Lincolnshire, by Newton, Chambers & Co., of Thorncleif, Sheffield. In both the Lincolnshire fields matters are quiet, only 11 of 21 furnaces being in blast. Near Sheffield there are a number of furnaces lying idle—at Parkgate and elsewhere. In manufactured iron little is being done. In girders, as is elsewhere the case, the Belgian agents secure almost all the orders for rolled qualities at £2 a ton under our prices, and are frequently successful in competitions for riveted lots. The Bessemer works are in fairly good occupation, mostly on home orders, which run at about £5. 12/6 @ £5. 15/ per ton, free on rail. There is a good call for steel wire of one description or other, partly for cables, colliery winding ropes and telegraphic uses and partly for fencing. I understand that a considerable quantity of this last class is being sent to Canada and the States. There has been no especial change in the file, saw, edge-tool and cutlery branches. Files are selling well for the Continental and home markets; saws for Sweden, Norway, Russia and India; edge tools for the Cape (small lots), India (large), New Zealand, Australia, Peru and Fiji, and cutlery for all these markets as well as to the States, whence saws of the leading manufacturers and merchants are receiving orders of encouraging proportions.

STAFFORDSHIRE AND BIRMINGHAM

have not experienced any great change in the general condition of their leading industries since the date of my last letter. As I have pointed out more than once of late, all the really best iron produced by the principal makers is selling in moderately large bulk, much of it on account of the requirements of the government dock-yards and other national departments, but a goodly proportion also in filling the indentures of colonial, home and Continental buyers. These brands, as a matter of course, are unchanged and nominally firm in price, on the basis of £3. 10/ for Bars, but they have little or no influence over the rest of the market, so that quotations are more irregular, in all probability, than at any former period. Individual underselling is a natural outcome of the existing state of things, and lists have apparently degenerated into matters of mere tradition. It is stated that the Shropshire Iron Company have secured government orders for wire; that Earl Granville is about to build two additional blast furnaces at Etruria; that Messrs. Colburn & Sons have blown in another furnace at Tipton, and that Mr. Onions has started the Regent Iron Works at Tipton for the purpose of manufacturing sheets. In the hardware trades there is a promising amount of work in course of execution, much of it for builders' requirements in the home markets, but a fair proportion for the larger colonies, India, the North of Europe, Egypt and South America. At Willenhall, Alexander Lloyd & Sons are running through a government order for stamped saddlery goods. The Staffordshire correspondent of the *Ironmonger* states that Wolverhampton houses are receiving specimen goods from Australian and other storekeepers, accompanied by requests to "imitate" the American labels and the goods themselves, so that the articles may continue to be made, and consequently purchased, in England. The correspondent adds that in some instances the request is being complied with, but in more declined. If this be so, I shall cease to sympathize with British complaints against German piracies of names and trademarks.

SOUTH WALES AND MONMOUTHSHIRE

These parts of the country are not in a satisfactory condition. Hope had been excited of the probable resumption of operations at Plymouth and Aberdare, but it is now denied that any such step is likely. Last week's principal shipment of iron from Cardiff was lot of 190 tons of rails from Rhymney to Sundwall. From Newport 341 tons of rails were dispatched and 7121 tons of iron ore imported. The tin plate trade remains dull. The Garth Tin Plate and Iron Company of Rhiwderin, Newport, has suspended payment, owing about £70,000, and it is rumored that another firm, owing £15,000, is in difficulties. At Rhymney Works, one pit with two converters made 1128 tons of Bessemer ingots, and would have produced more but for the breakdown of the blowing engine. In a single shift one converter turned out 121 tons. At Dowlais 1300 tons have been made in a week in a single pit.

THE METAL MARKETS

have been very weak all round, with attendant lower prices. The *Ironmonger* reports: "Copper has been weak, with incidental lapses in prices, which are now lower than for 30 years. Chili bars are sold at £0. 15/ @ £61. 10/; Wallaroo, £72; Burra, £70. 10/; English cake and ingot, £67; sheets, £71. The exports are in excess of this time last year, but supplies are very large. There is no hope at present of any rise. At Redworth tributary copper ore realized an average of £3. 14/ 10/ ton. Tin has not improved in price, although there has been a little more business in it. Straits and Australian are quoted £60 @ £60. 10/; Banks, £63; English ingots, £65 @ £65. 10/; English refined, £68. For the first four months of the year the imports of tin have been 123,371 cwt., against 97,055 in 1877; the exports, 37,811 cwt., against 33,478. Lead keeps dull and prices unchanged. English pig is quoted £16. 17/ 10/; W. B., £17. 10/; sheet and bar, £18; Spanish, £16. 10/ @ £16. 12/ 6. The imports of lead for 1878 to date have been 33,216 tons, against 31,404 in 1877; and the exports, 11,546, against 11,963. Quicksilver has again been in but limited request, at £6. 15/ @ £

10/ flask. Spelter rather weaker, remaining at £17. 15/ @ £18. 5/ for Silesian and £21 for English. Zinc for the most part unchanged. At Messrs. Sargent's fortnightly sale on Thursday, 85 tons sold at £20. 7/ 6 and 15 tons at £20. 10/ 10. Antimony unaltered at £49 @ £49. 10/."

Von Dadelszen & North's circular is similar in tone.

Iron and metals are not materially changed at Liverpool. Messrs. Harrington, Horan & Co. report thence: "About 1000 tons Chili bars sold since our last at £65 down to £60. 10/ since which prices have improved again, and to-day we quote £61. 10/ @ £62 10/ ton, according to brand. In furnace material the sales were confined to 150 tons rich Spanish precipitate at £12. 3/ 3; 30 tons English, £12. 4/ 2; and 45 tons Spanish, £11. 9/ per unit; 329 tons New Quebec ore, £11. 6/; 500 tons Cape ore, £11. 10/; and 125 tons Mexican ore, £12/ per unit. There were no sales of Chili ore or regulus during the fortnight, and the nominal quotations are £11. 9/ @ £12/ per unit. Chili copper charters for the second half of April were 1800 tons, all bars, of which 300 tons go to the Continent. Quotations are: Chili bars, £61. 10/ @ £62; Chili ingots, £68; Chili ore and regulus, £11. 9/ to £12; and Coro Coro Barilla, £13. 6/.

Arrivals here during the fortnight of West Coast South America produce have been: The Iberian from Valparaiso, 820 bars and 85 ingots; and Magnet, from Carrizal, 745 regulus. At Swansea—Nil. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate: At Liverpool, 917 regulus and 13,605 bars; Swansea, 2189 tons, 6011 regulus and 2043 bars, making totals of 2189 tons, 7828 regulus and 15,638 bars, representing about 19,609 tons fine copper, against 19,600 tons on the 30th ult., against 15,252 tons do. on May 15, 1877. The stock of Chili copper in Havre is 8083 tons fine, against 9274 tons May 15, 1877; stock of Chili copper afloat and chartered for to date, 9500 tons fine, against 12,000 tons May 15, 1877; and stock of foreign copper in London, chiefly Australian, 6495 tons fine, against 4400 tons May 15, 1877. Tin—Market quiet at £61 for Straits and Australian; £65 for British, and £55 for Peruvian. Lead—Market dull at £17 for ordinary shipping brands. Spelter—Market dull at £18 for ordinary Silesian brands."

Convict Labor

The Philadelphia *North American* says: The deposition of Capt. Pillsbury from the superintendence of the Albany Penitentiary is undoubtedly a concession to a public clamor against the employment of criminals as producers. And though it may, as a temporary asserts, measure the growing importance of the class from whom the clamor proceeds, and its influence with political managers, that fact ought not to deter anybody from discussing the matter candidly and fairly. If it can be shown that the employment of persons in distress of imprisonment robs any man of work who is willing to work, this clamor will start with the advantage of a grievance, at least. But that has not yet been shown. In prosperous times very little is heard about the adverse effect of convict labor, yet its effect must be the same upon labor in general whether the times are prosperous or otherwise. So long as there is work enough for all, and wages are fair, the effect of convict labor is not perceptible. Naturally, in such times, only the coarser and low-priced products are turned out by prisons and reformatories, unless it be in special cases. For when work is plenty there is a good market, and a good market means remunerative hire for labor.

But the only candid way to deal with this subject is to assume as existing a social situation in which there are no prisons, and consequently no convicts. Clearly, under such conditions, the mass would be now, producers, only the number would apparently be much greater. To increase the producing hands without increasing the demand for production, would of course tend to lower market rates. The competition would be so great that the more pushing would fare best, and in a very short time the fall in wages and the inability of many to cope with those stronger would bring about pretty nearly a state of affairs similar to that which rules to-day. And we should hear the same denunciations of cheap labor and the tyranny of capital that we hear now. This brings us to the question, Are we to suppose that the constant isolation of some members of the producing classes in penitentiaries is necessary to insure the thrift of the virtuous and orderly remainder? Could or could not the mass of producers manage to live and thrive were not some thousands of their number annually taken from the field of voluntary labor and shut up in compulsory idleness? If they could manage to live with the entire mass at large, what hinders them from living when, say, 50,000 are shut up in prison, and not more than half that number do anything at all, except to devour their rations?

Now, if it is absolutely necessary to the well-being of the working masses that from 50,000 to 100,000 people should be shut up in prisons and kept in utter idleness all the time, what are we to think of such a state of things? When Malthus first propagated his views on population, the Christian world held up its hands in horror. But if the gentlemen who are rending the skies with their denunciations of convict labor do not assent to the third Malthusian proposition, what do they mean? Either the penitentiary is a saving institution or it is not. And if it is not, then whether a man makes a pair of shoes inside or outside of its walls can make no difference whatever. But if the penitentiary is a check upon population, to keep it on a level with the means of subsistence, then we can understand the Sineys, the Hugheses and the Wrights, together with their fellow-statesmen in the State of New York.

But we should be glad to have them come squarely out and say that it is necessary to reduce the number of producing hands by boarding, clothing and lodging about 100,000 persons at the public expense in genteel idleness. If that is what they mean, why not say so? If it is not what they mean, what do they mean? Probably they do not know

what they mean themselves. But Mr. Mal- thus knew exactly what he meant, and he said it so plainly that not even the stupidest of these heralds of reform can possibly mistake his meaning. We have purposely omitted to argue the question in its moral aspects—whether work is necessary to the convict or not—because, for the most part, those who cry out against convict labor regard work as a curse, and could not comprehend the argument.

Pennsylvania Communists

A correspondent of the New York *Times*, writing from Philadelphia, says:

There has been a great deal of uneasiness felt in Pennsylvania concerning an alleged Communistic movement and a threatened outbreak of the unemployed working people. When the wild stories from the West were first put into circulation, the authorities here began investigating the strength of the movement at this point. It was found there were numerous lodges of the Knights of Labor who were organized ready for an emergency, but at this time Mayor Stokely states there are not more than 500 members in all the Communistic societies in the city. The chief officer of one of the most prominent detective bureaus in the country, whose headquarters are in this city, says on the line of the railroads between Philadelphia and Pittsburgh there are not less than 15,000 men who stand ready at a moment's notice to begin the disgraceful scenes witnessed last summer. His information comes from the numerous detectives of the agency, who are in the employ of the principal railroad companies in the country. He reports the feeling of the workingmen as ripe for another Communistic uprising, and that they are organizing under the guise of beneficial societies. Of these associations there are about fifteen, with branches extending to all parts of the State, and creeping into the southern tier of counties of New York. Whether there will be another strike this summer can not be told yet, but it is certain there are preparations making for it.

Should a riot occur in Pennsylvania at the present time the results would be more disastrous than before, because there is no means of putting it down until volunteers could be called out. The militiamen became so disgusted with the manner in which they were treated last summer during the Pittsburgh troubles that, after they came home, too resigned. Within the last week Major Gen. Brinton, of the First Division, his staff and Brig.-Gen. Loud and his staff resigned.

Following these officers more men will go out. It is confidently believed that if a call was made to-day for troops from this city not more than 1000 men, if so many, could be mustered. The condition of affairs noted here is the same throughout the State. A bill was passed by the last Legislature to reorganize the militia, but it will require some months to accomplish this. In the meantime the whole body of militia in the State is little better than an organized mob. Orders have been issued requiring that rosters be kept at all the armories of the places of residence, and employment of all the members of militia companies, while, if there is a call, they are to provide themselves with rations for three days. Militiamen are also compelled to keep their uniforms and equipments at the armories instead of at home, as heretofore. Notwithstanding statements to the contrary, every preparation is being made to put down an uprising. Mayor Stokely, a few days ago, made a requisition through Gov. Hartman, upon Secretary of War McCleary for 400 breech-loading rifles. These are to arm the police. The officers drill twice a week in the manual of arms at the military armories, a duty which has not heretofore been imposed upon them. There is scarcely a financial institution of any magnitude here which has not made preparations to resist the attack of the mob. One of the largest has perfect arrangements in this regard, so that the doors could be instantly closed in case of attack, and each clerk has but to throw back a panel in the side of a

desk, where a carbine is kept, so that in less than a minute there would be 50 clerks armed and ready to do duty with seven-shooters. Recent travels through the State show that the sentiment of the workingmen is dangerous, and that should the scenes of 1877 recur, they all seem to have their plans laid for a system of pillage, which did not occur to them before.

Decline in the Value of Mill Property

—On Wednesday last the Salisbury Mills were sold at auction in Boston for the sum of \$160,000. The original or total cost of the mills was \$1,200,000, or, in other words, they brought less than one-seventh of their cost, and were bought by Mr. John Gardner, who for many years previously, in their more prosperous days, was their manager. Large numbers of capitalists from New York, Philadelphia, and other points attended the sale, the terms of which were cash in 10 days, or \$100,000 on

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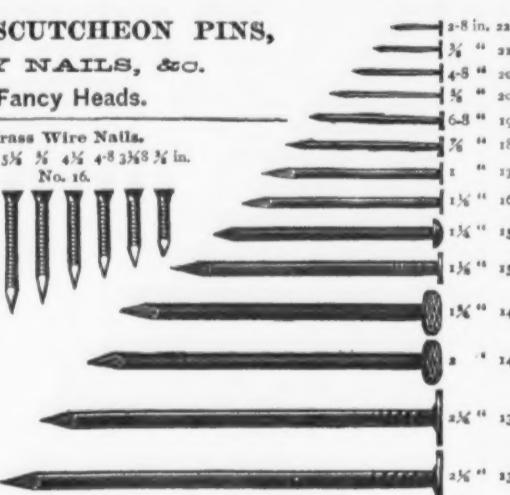
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PORTABLE FIRE ESCAPE.

To use this Fire Escape, tie the short end of the rope to the bed-post and throw the long end to the ground. Then put the Sling around your waist and get out of the Window. Regulate your speed by the pressure of your hand on the rope. It is under easy and perfect control. A second person can use it by drawing it up and tying the other end to the bed-post. A person in the room can let down another and then go down himself. It is a wonderfully simple and perfect invention, and should be owned by every one who sleeps above the first floor.

PRICE, with 50 feet of braided linen rope of 800 pounds tensile strength, - - \$2.50.

Weight, with rope, 2 pounds. Extra rope, 2 cents per foot. Delivered to any express on receipt of the price, or sent by mail postpaid for 50 cents extra.

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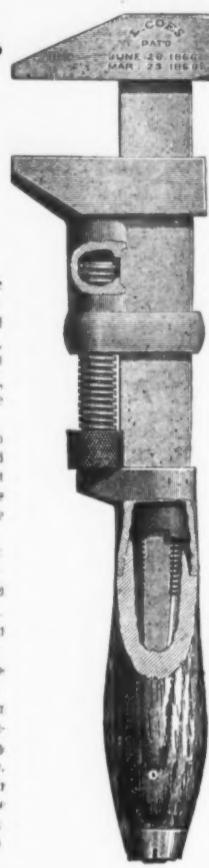
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We invite the particular attention of the trade to our New Straight Bar Wrench, widened full size of the larger part of the so called "reinforced or jogger." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

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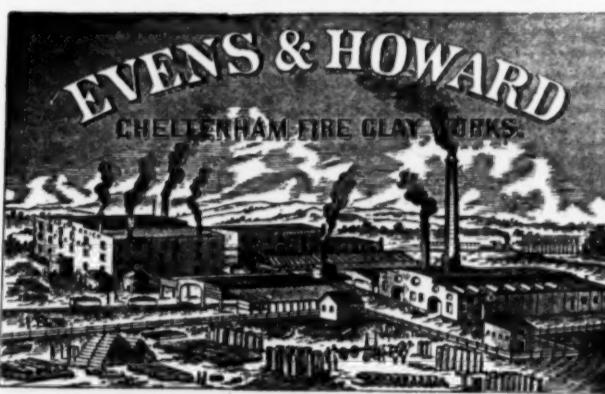
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HOG RINGER
RINGS AND HOLDER.
Only double ring ever
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Ringers, 75c. Rings, 50c. 100. Holders, 75c. Huskers, 15c.

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CORN HUSKERis the best Husker in the
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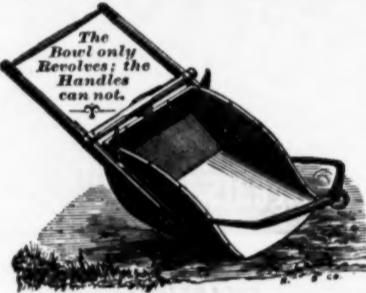
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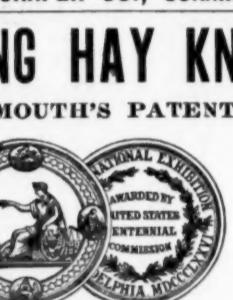
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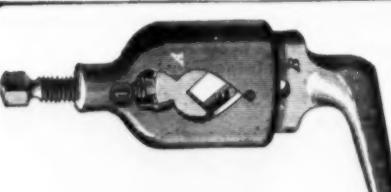
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Swivel and Coachmakers'
VISES.The Best Rapid Adjustable Vise in
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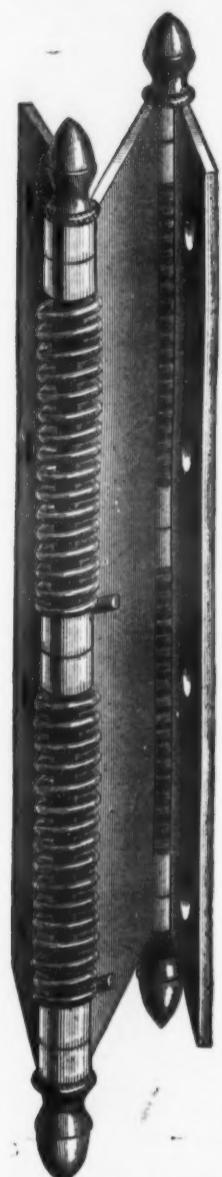
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SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2 3/8 inch.....	\$ 3 00	\$ 4 50	\$ 5 00	\$ 6 50
3 " "	4 50	6 50	6 75	8 75
5 " "	7 50	10 00	10 00	12 50
4 3/4 x 4 1/4 inch.....	18 00	23 00	21 00	26 00

The 4 3/4 x 4 1/4 is Extra Heavy.

DOUBLE JOINT HINGES. (To swing both ways.)

To be used on door 1 inch thick, or less.

SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2 3/8 inch.....	\$ 6 60	\$ 9 00	\$ 11 50	\$ 14 25
3 " "	8 30	11 50	13 50	17 00
5 " "	16 50	21 00	21 50	26 00

The large cut represents full size of our 5 inch Double Joint Acorn Tip Hinge for mortising.

The small cut represents the plain Single Joint Hinges, but not full size.

Liberal Discount to the Trade.

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FLORENCE OIL STOVES.



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ODORLESS OIL STOVE

MADE



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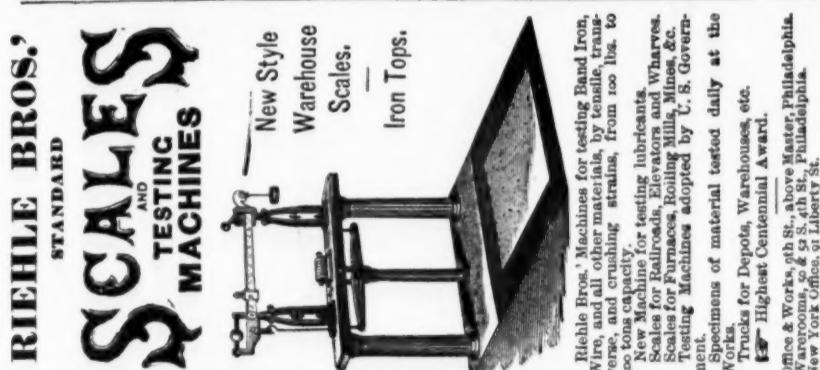
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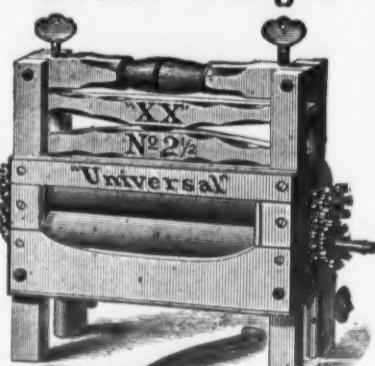
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No. 1, Large Laundry size, Rolls 12x2.....93.00
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Outfits complete, with Dynamo-Electric Machine
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We call attention to infringements of the Weston

Machine, in which Automatic Switches are used to prevent closing of the door. Weston Co. are

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tion of these machines will certainly lead to great

loss to parties purchasing or using them.

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Successor to S. S. OWEN & CO.

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Acknowledged Favorite, will appear for season of 1878 with entire changes,

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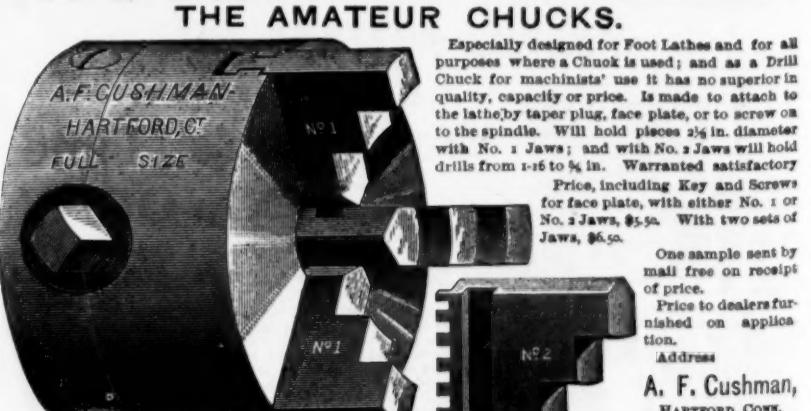
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1876.

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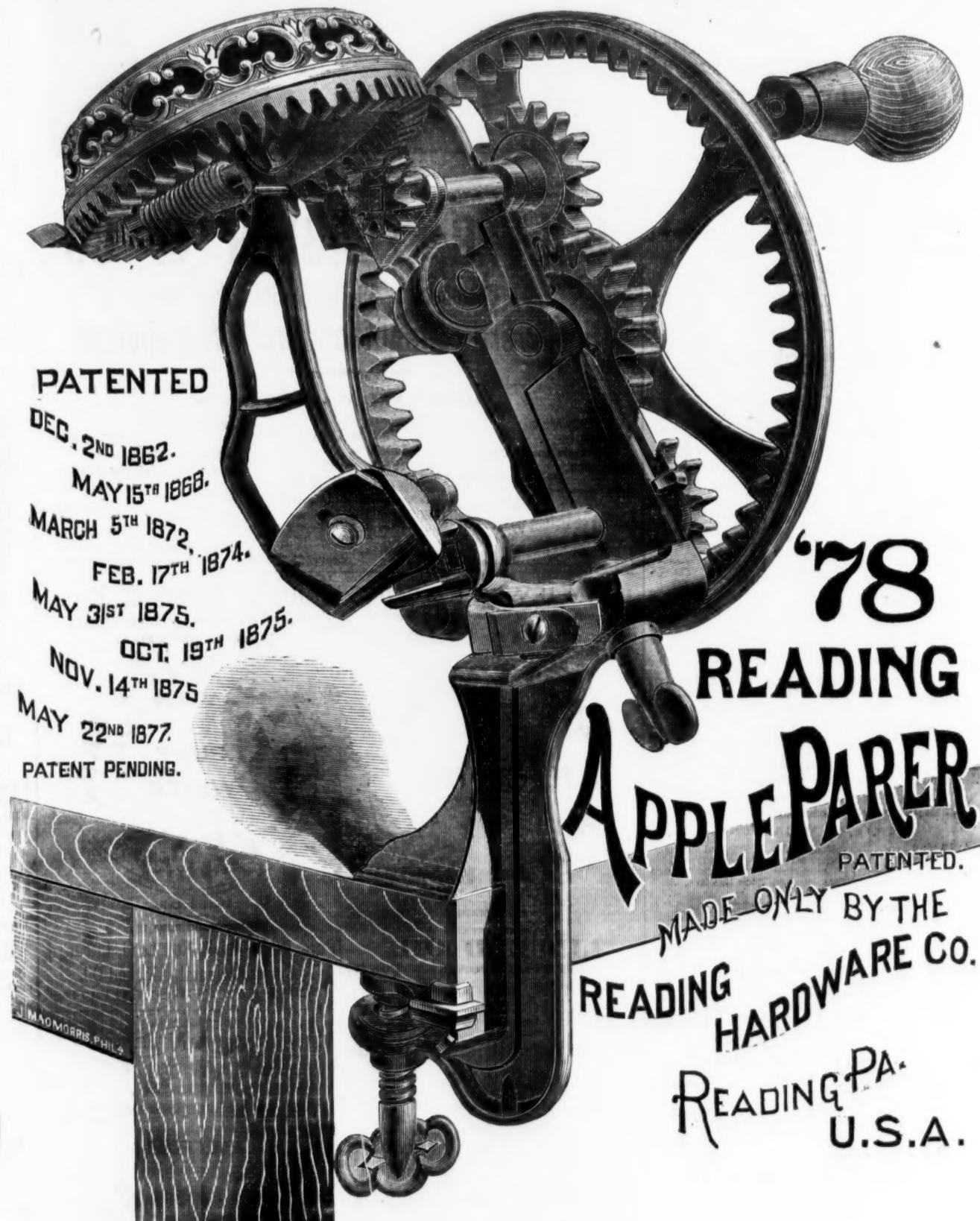
1st. The curved shape of the extra knife enables it to completely remove all the parings from the base of the apple before the operation of the principal knife.

2d. In its attachment to either front, side or corner of the table, its oblique position places the apple completely in view, and the parings falling free avoids all clogging of the machinery.

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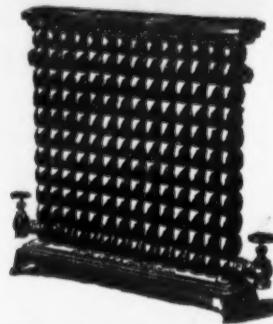
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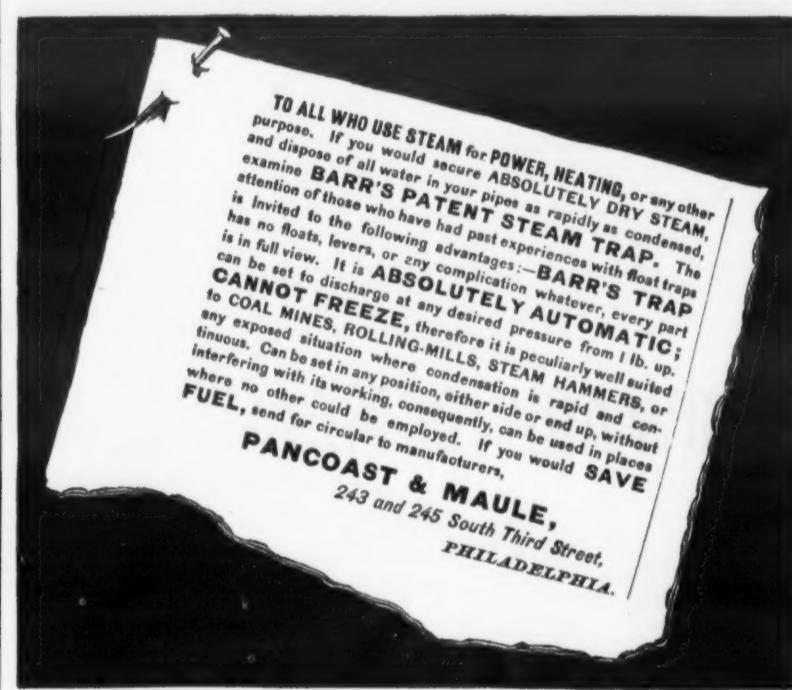
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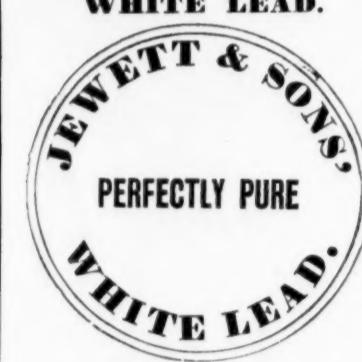
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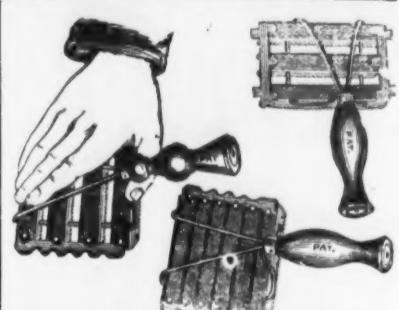
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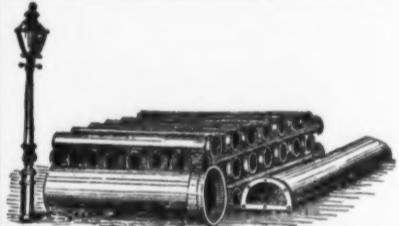
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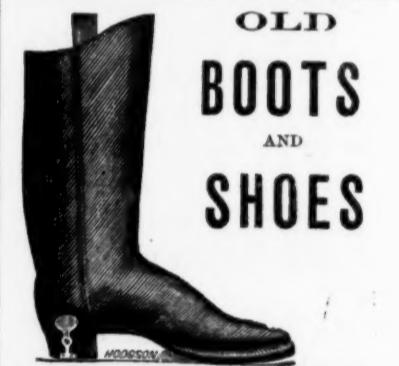


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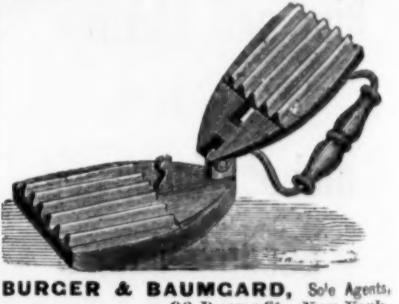
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Leeds & Northwood, Lancasterville, N. J.	44
Drilling Machines, Makers of.	
Bickford H., Cincinnati, O.	18
Thorne & Haven & Co., Philadelphia.	44
Boker Hermann & Co., 100 Duane, N. Y.	24
Ward & Son, 100 Broadway, N. Y.	24
Drop Forges.	
Boker Hermann & Co., 100 Duane, N. Y.	24
Rose Wm. & Bros., West Philadelphia, Pa.	13
Drop Presses.	
Bachelder & Sons, New Haven, Conn.	46
Edge Tools, Makers of.	
The D. R. Barton Tool Co., Rochester, N. Y.	30
Doscher M., 4 and 5 Gold, N. Y.	29
Electrodes.	
Boston Rolling Mill, 17 Batterymarch, Boston	5
Crane Bros. Mfg. Co., Chicago, Ill.	9
Lane & Bowley, Cincinnati, O.	47
Stason & Co., Providence, R. I.	45
Stow & Bowles, Philadelphia, Pa.	44
Elevator Buckets.	
Rivet Bucket Co., Chicago, Ill.	30
Rowland F. F., Brooklyn, N. Y.	6
Lehigh Valley Emery Wheel Co., Weissport, Pa.	48
Engineers, Machinists, &c.	
Southern States Coal, Iron & Land Co., South Pitts-	
Tenn.	
Todd Jones C., 100 Barclay, N. Y.	6
Engines, Caloric.	
Brown Caloric Engine Co., 57 Lewis, N. Y.	46
Brown & Company, 100 Barclay, N. Y.	46
Baltim. & Sons, Engine Works, Philadelphia, Pa.	4
W. & A. F. & Co., 100 Barclay, N. Y.	46
Lovegrove & Co., Philadelphia, Pa.	44
Payne B. W. & Sons, Corning, N. Y.	46
Export Factors.	
Jennings S. H., Deep River, Conn.	24
McNab & Harlin Mfg. Co., 50 John, N. Y.	34
Faucets, Brass, Makers of.	
Enterprise Mfg. Co., Pa., Philadelphia, N. Y.	35
Felt and Wadding.	
Bacon Chas. N., Winchester, Mass.	73
Files, Importers of.	
Car & Riley, 12 John, N. Y.	46
Other Jones & Co., Commerce, Phila.	31
Fraser Peter A. & Co., 54 Fulton, N. Y.	8
Moss F. W., 80 John, N. Y.	40
Sanderson Bros. & Co., 16 Cliff, N. Y.	40
Filings.	
Boat Chas. N., Winchester, Mass.	73
Fishes, Manufacturers of.	
Boat Chas. N., 100 Barclay, N. Y.	46
Flint and Emery Paper and Cloth.	
Baader, Adamson & Co., 730 Market, Phila.	30
Flower Pot Stands.	
Barnum E. T., Detroit, Mich.	1
Folding Machines.	
The American Machine Co., Philadelphia.	42
Auburn File Works, 50 Chambers, N. Y.	8
Barnett G. H., 44 and 45 Richmond, Phila.	8
Blaston Henry & Sons, Phila.	37
Everhart James, 100 Franklin, N. Y.	8
Fisher & Sons, Newark, N. J.	48
Johnson & Bros., 1 Commercial, Newark, N. J.	48
McCaffrey & Co., 1723 and 1744 Broad, N. Y.	48
Hall & Sons, 100 Franklin, N. Y.	48
Hall & Sons, 100 Franklin, N. Y.	48
Krebsch & Sons, 60 Chambers, N. Y.	48
Newton & Co., 100 Franklin, N. Y.	48
Wright & Sons, 100 Franklin, N. Y.	48
Fire Brick, Makers of.	
Borgner & O'Brien, Philadelphia, Pa.	23
Brooklyn Clay Retort and Fire Brick Works, Van	23
Dyke St., Brooklyn, N. Y.	23
Hoover & Co., 100 Franklin, N. Y.	48
Gardner, Stuart & Co., Pittsburgh.	23
Hall & Sons, 100 Franklin, N. Y.	48
Hall & Sons, 100 Franklin, N. Y.	48
Krebsch & Sons, 60 Chambers, N. Y.	48
Newton & Co., 100 Franklin, N. Y.	48
Wright & Sons, 100 Franklin, N. Y.	48
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Dyke St., Brooklyn, N. Y.	23
Gardner, Stuart & Co., Pittsburgh.	23
Hall & Sons, 100 Franklin, N. Y.	48
Krebsch & Sons	

ENTERPRISE MANUFACTURING COMPANY of PA.

Patented Hardware Manufacturers and Iron Founders.

Third and Dauphin Streets,

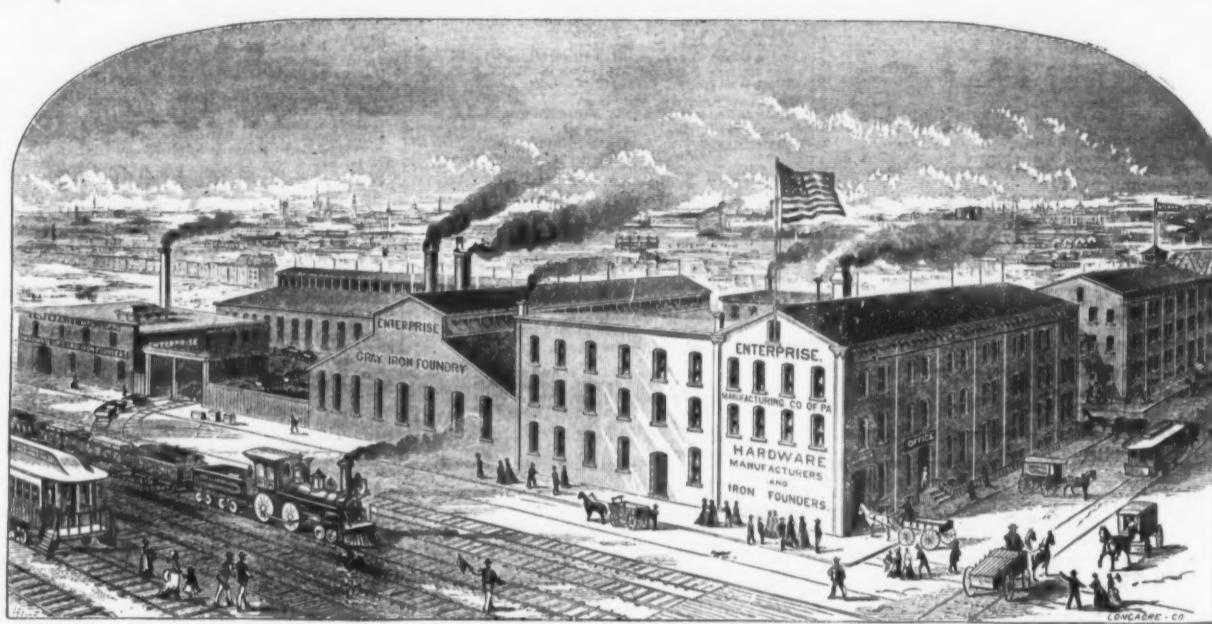
PHILADELPHIA.

SPECIALTIES:

Enterprise Patent Cold Handle
Double Pointed
Smoothing, Polishing
and Girls'
IRONS.

Patent Measuring Faucets, Self-
Weighing Cheese Knife,
Champion Tobacco Cutters,
&c., &c.

SEND FOR ILLUSTRATED CATALOGUE AND PRICE LIST.



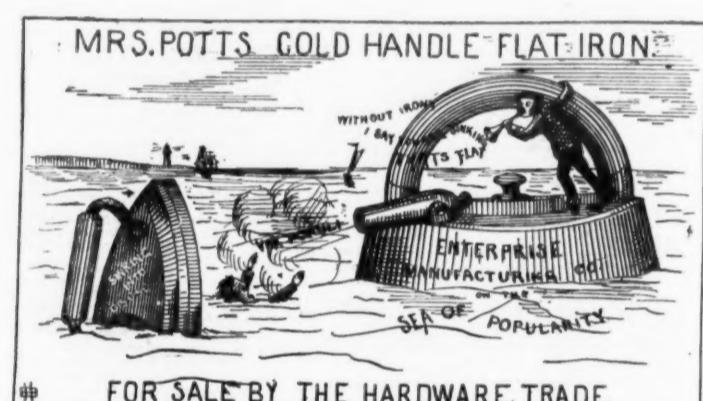
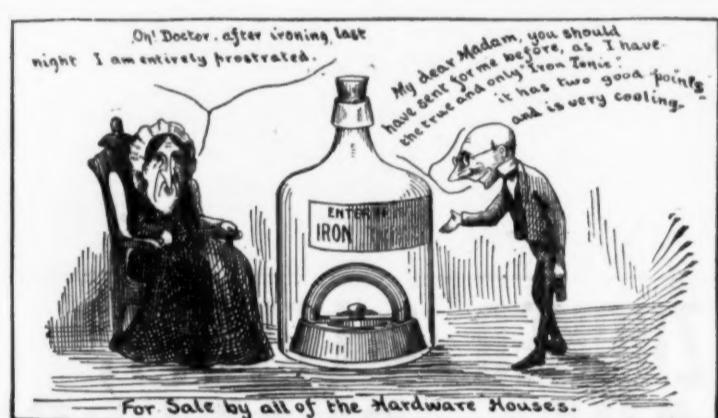
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SPECIALTIES:

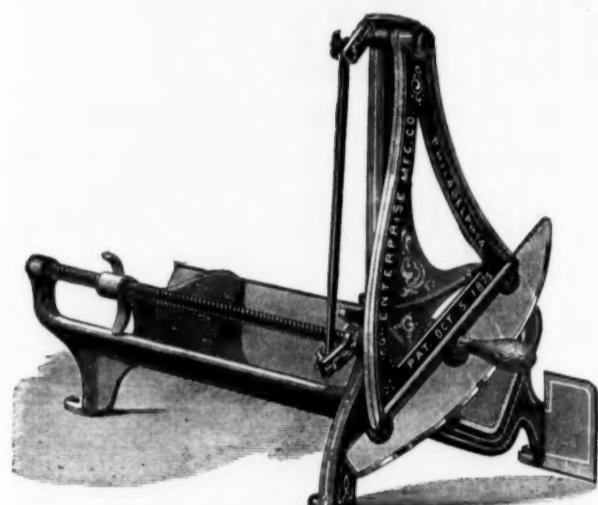
American Coffee, Spice
and Drug Mills.
Combined Sausage Stuffer, Fruit
Lard and Jelly Press.
Champion Dried Beef Shaver.
Bung Hole Borers.
Coffee Roasters, &c., &c.

SEND FOR ILLUSTRATED CATALOGUE AND PRICE LIST.

VIEW OF WORKS.



SHOWING A FULL SET OF IRONS.

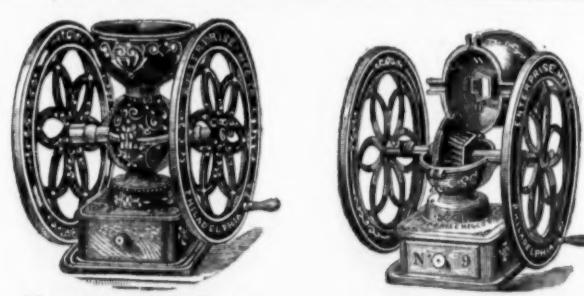


Have you seen our
**New Champion Dried
Beef Shaver.**

It is the Simplest.
It is the Cheapest.
It is the Best.

We guarantee it superior to all
others in the market.

PRICE, - \$6.00 each.



The season is near at hand
for using these machines.
We ask a comparison with
others in the market, both as
to price and quality.

We make twenty sizes Coffee Mills, from \$2.00 to \$100.00

HENRY DISSTON & SONS

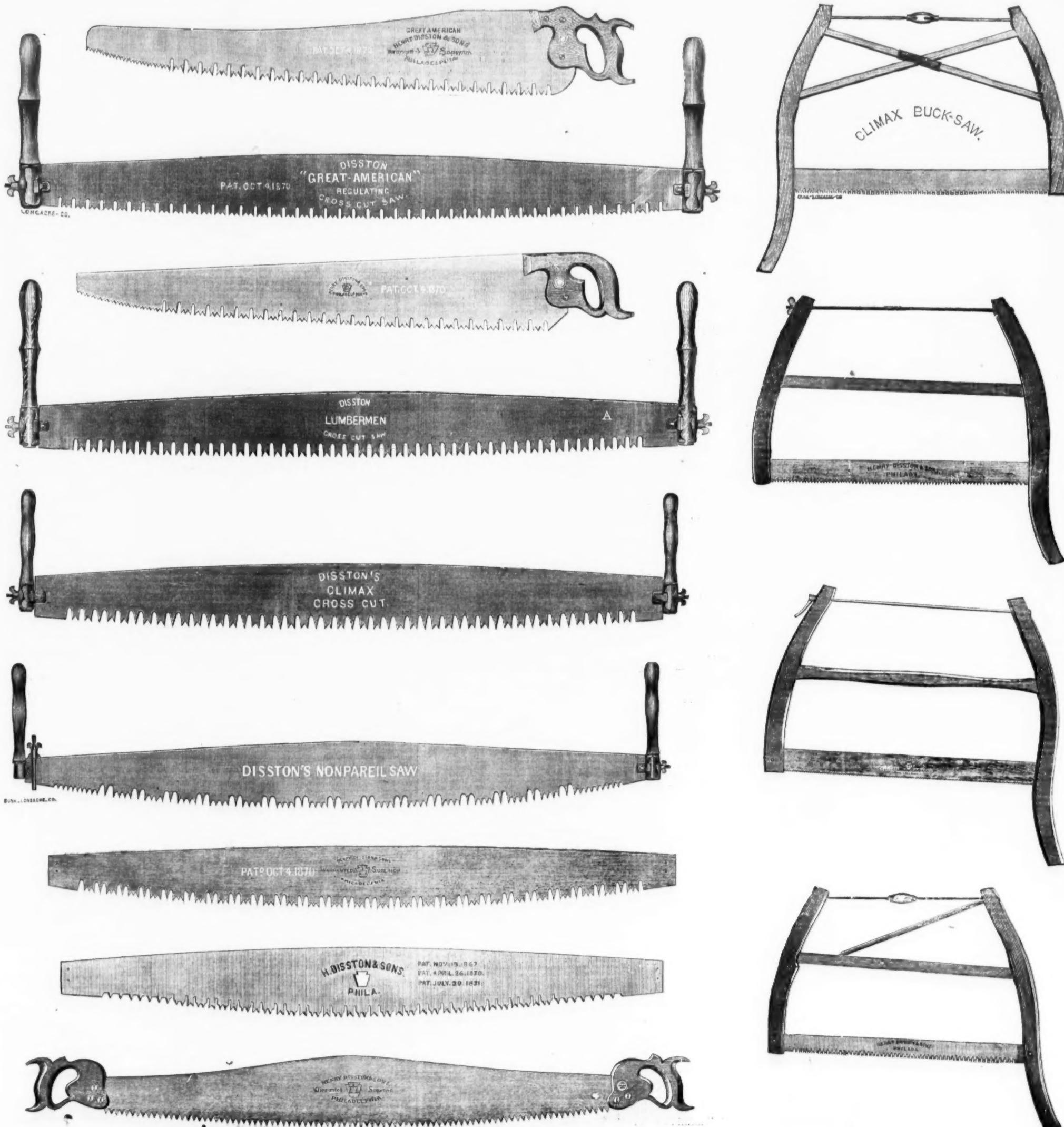
Keystone Saw, Tool, Steel & File Works.

FRONT AND LAUREL STREETS, PHILADELPHIA.

Branch Works, Tacony, Philadelphia.

Branch House, Randolph & Market Streets, Chicago, Ill.

OUR CELEBRATED CROSS-CUT AND WOOD SAWS.



New York Wholesale Prices, June 5, 1878.

HARDWARE.

Awls.	...
Wright's.	in gold 10¢ over 250 lbs 10¢, gold 10¢ over 250 lbs 10¢, gold 10¢ over 250 lbs 10¢.
Armitage's Mouse Hole.	gold 10¢ over 250 lbs 10¢.
Wade's.	gold 10¢ over 250 lbs 10¢.
Cast Anvils (American).	gold 10¢ over 250 lbs 10¢.
Apple Pliers, &c.	...
Turn Table.	10¢ doz 65¢, dis 10¢.
Lightning.	10¢ doz 65¢, dis 10¢.
Reeding.	10¢ doz 65¢, dis 10¢.
"	7¢ doz 70¢, dis 10¢.
"	7¢ doz 80¢, dis 10¢.
"	7¢ doz 75¢, dis 10¢.
Climax Cut, Saws.	7¢ doz 75¢, dis 10¢.
Augers and Bits.	...
Conn. Valley Mfg. Co.	...
Douglas Mfg. Co.	...
Deerfield.	...
Beecher (French, Swift & Co.).	dis 50¢.
Griswold.	...
Nobles Mfg. Co.	...
Smith Bros.	...
Cook's, Douglas Mfg. Co.	...
Cook's, Ives.	...
Snell Mfg. Co.	...
Imitation Jennings' Bits.	...
Ives' " Jennings" Bits.	...
Lewis' Single Twist Bits.	...
Andrus.	...
Griswold's Patent Bits.	...
Expanding Bits, Clark's, small, \$18; large, \$20, dis 20¢.	...
" Ives.	...
" Parmelee's.	...
Hollow Augers Ives.	...
" Smith, Swift & Co.	...
" Bonney's Adjust.	10¢ doz 25¢, dis 20¢.
" Stearns' Adjust.	10¢ doz 25¢, dis 20¢.
" Ives' Expansive.	each 24¢, dis 10¢.
" Universal.	...
Gimlet Bits.	...
" Diamond.	10¢ doz \$1.00, dis 25¢.
" Bee".	...
Double Cut Gimlet Bits.	...
" C. Valley Mfg. Co.	...
" Hartwell.	...
" Douglas".	...
" Hartwell.	...
Morse's Bit Stock Drill, List of Mfg. Co.	...
L'Hommedieu's Ship Augers.	...
Watrous Slit Augers.	...
Awl Holes.	...
Sewing, Brass Ferrule.	35¢ to 50¢ gross—dis 35¢ to 50¢.
Peg.	...
Patent Sewing, Short.	10¢ doz 35¢ to 50¢.
" Peg, Long.	10¢ doz 40¢ to 50¢.
" Peg, Plain Top.	10¢ doz 35¢ to 50¢.
" Peg, Extra.	12¢ doz 35¢ to 50¢.
Brad Peats, Alken's.	...
" No. 40, \$1.50; No. 43, \$1.50.	...
" Stanley's Excisor.	...
Axes.	...
Common (Guy C. Hothckiss, Field & Co.).	...
Solid Collar, Case Hardened, Chilled Box.	...
Cast Iron.	...
Axle Grease.	...
Balances.	...
Light or "Common".	...
All other Spring Balances.	...
Bar & Keys.—Gray's Hatchet.	...
Hatchet.	...
Light, Bright.	...
" Extra.	...
" White Metal.	...
" Silver Clime.	...
" Swiss.	...
" Glass (Conn's).	...
Gong, John's.	...
Yankees.	...
" Barton's.	...
Crank, Taylor's.	...
" Cone's.	...
" Connelly's.	...
Lever, Sargent's.	...
Taylor's Bright Plated Lever.	...
" Hart, Bliven & Head Mfg. Co.	...
Pull.	...
" Brook's.	...
Cal.	...
Cow, Common Wrought.	...
Western.	...
" Sargent's.	...
" Kentucky " Star.	...
" Sargent's.	...
Boo's G. G. & Co.	...
\$12.00 10.00 8.00 6.00 5.00 3.50 2.50 1.50, dis 50¢.	...
Yawn's Genuine.	...
" Texas.	...
Heel.	...
Blacksmiths' Common.	...
Extra and Pittsburgh Pattern.	...
Moulds.	...
Heavy Bellows.	...
Blind Adjusters.—Mackay's.	...
Blind Fasteners.	...
Blind Staples.	...
Boardman's Patents.	...
Blow Gun.	...
Blocks.—Burk & Co.	...
Brass Tack.	...
Tack, Rose and Iron Strapped (The Penfield R. W.).	...
Stanley Rule and Level Co.	...
Keystone Portable Forge Co.	...
Bolts.	...
Cast Iron, Barret, Shutter, &c.	...
Cast Iron Chain (Sargent's list).	...
Bush's Lever Bolts.	...
Spring Bolts (Hudson & Beckley Mfg. Co.)	...
Wrought Iron Bolts.	...
" Shutter (Stanley's list).	...
" (Sargent's new list).	...
" Burk's.	...
" Shutter.	...
" Stanly's.	...
" B. K. Flush, Conn'n, Stanly's do 50¢.	...
" Heavy.	...
" Plated Knob and Slit Flush.	...
Carrington and T. Common.	...
Norway Iron.	...
" R. B. & W. (old list) do 50¢ to 70¢.	...
" Coleman.	...
" Shutter.	...
Tire, Am. Screw Co.	...
Star (Philadelphia).	...
Union Nut Company.	...
Stover—American Screw Co.	...
" R. B. & W.	...
Plow.	...
Macrine.	...
Bolt Ends.	...
Bolt and Rivet Clippers.	...
Box.	...
Brass Machines.	Upright, Angular.
First quality, no Augers.	85¢ to 90¢ dis 40¢ to 50¢.
Second quality, no Augers.	2.25 4.00 6.00.
Snell's, no Augers.	4.75 10.00 dis 25¢ to 50¢.
Phillips' with Augers.	10.00 doz 25¢ to 50¢.
Bronze.	...
Union Nut Co.	...
Hotchkiss.	...
Humason, Beckley & Co.'s.	...
Sargent & Co.	...
Wright's.	...
O. S. Backus.	...
Winton Mfg. Co.	...
Spoftow's Patent.	...
Novelty.	...
Inv. 1. " Item 11".	...
Common Bolts (A. E. Bell Face).	...
Brackets.—Sargent's, stent.	...
Brackets.—H. C. Hart's, stent.	...
Brackets.	...
Brackets.	...
Door Springs.	...
Torrey's Rod.	...
Gray's Rod.	...
McGraw's Rod.	...
No. 1, Large, Japanned.	...
No. 2, Medium.	...
Challenge (Coll.)—	7¢ 6
Japanned.	...
Coppered.	...
Galvanized.	...
Nickled.	...
Premium (Coll.)—	10¢ 25¢
No. 1.	2 3
Japanned.	...
Japanned.	...
Star (Coll.)—For Cop'd, Nickel-plate'd, see list.	...
Screen Door Size.	...
No. 5, Medium.	...
No. 6, Medium.	...
Challenge (Coll.)—	10¢ 25¢
Japanned.	...
Coppered.	...
Galvanized.	...
Nickled.	...
Premium (Coll.)—	10¢ 25¢
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Japanned.	...
Japanned.	...
Star (Coll.)—For Cop'd, Nickel-plate'd, see list.	...
Screen Door Size.	...
No	

Steel.

R. H. WOLFF & CO.,
 IMPORTERS OF
IRON AND STEEL.

Sole Agents for the Sale of the Celebrated
Pr. HOMOGENEOUS DEC. CAST STEEL, GUN BAR-
RELS, MOULDS AND ORDNANCE.

Sole Agents for **COCKER BROTHERS**, Limited,
 Successors to **SAM'L. COCKER & SON**, (ESTABLISHED 1752.)
SHEFFIELD, ENGLAND.

Sole manufacturers of
"SC" EXTRA" Cast Steel,
 AND
CAST STEEL WIRE for all purposes.
 Sole Makers of

Cocker's "Meteor" Wire Plates.
 Railroad Supplies and General Merchants.
 Office and Warehouse, 46 Cliff Street, New York.

F. W. MOSS,
 Successor to **JOSHUA MOSS & GAMBLE BROS.**
 FRANKLIN WORKS, WADLEY BRIDGE WORKS, SHEFFIELD, ENGLAND.

STEEL AND FILES.

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.

MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,
 Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL especially adapted for Dies and TURN-
 BINS, SCREW WRENCHES, DRILLS, COLD CHISELS,
 FUCHEES and all kinds of MACHINISTS' TOOLS.
 Celebrated Improved Mild Centre Cast Steel, for Taps, Hammers, and Milling Tools,
 warranted not to crack in hardening Taps of any size.
 Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
 English Spring and Flow Plate Steel.

Sheet Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

GENERAL MERCHANT.

ALBANY & RENSSELAER IRON & STEEL CO.,
 TROY, N. Y.,

Office in New York City, 56 BROADWAY.

MANUFACTURERS OF

Bessemer Railway Steel,
 MERCHANT BARS, TIRE AND SHAFTING.

Railroad Iron, Pig Iron, Merchant and Ship Iron,
 AGENCIES IN BOSTON AND PHILADELPHIA.

D. G. GAUTIER & CO.,
 MANUFACTURERS OF

Hammered and Rolled STEEL of every description
 JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER.

JOSIAH H. GAUTIER.

FRANCIS HOBSON & SON,
 97 John Street, NEW YORK,

Sole Manufact'rs of "**CHOICE**" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

S. & C. WARDLOW,
 Sheffield, England,

Manufacturers of the Celebrated

Cast and Double Shear
STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives,
 Turning Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

Warehouse, 95 John Street, New York.

WILLIAM BROWN, Representative.

Established 1810.

J. & RILEY CARR,
 SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated
"DOG BRAND" FILES.

Also of Superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &c.
COLD ROLLED STEEL for Clock Springs, Corsets, &c.
SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.
 GERMAN, MACHINERY, ENGLISH AND SWEDES SPRING STEEL.

And all other descriptions for machinists and agricultural purposes.
 Warehouse, 30 Gold Street, New York.



HENRY MOORE, Agent.

near John Street.

Steel.

SANDERSON BROS. STEEL COMPANY,
 GEDDES WORKS, SYRACUSE, N. Y.

Manufacturers of the Celebrated
SANDERSON BROTHERS & CO.'S
CAST STEEL,

Warranted most **SUPERIOR** and **UNSURPASSED** for
TOOLS and **GRANITE ROCK DRILLS.**

EDWARD FRITH, Treasurer, 16 Cliff St., New York.
 WILLIAM A. SWEET, General Manager, Syracuse, N. Y.

A full assortment of this universally approved OLD BRAND of English Steel

For Sale at

16 Cliff Street, NEW YORK.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,
 MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.
 OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, Pittsburgh, Pa.

Represented at Boston by W. M. HORNE, 127 Oliver St.; at Milwaukee by JOHN PRITELAFF, 43 to 49 West Water St.; at Chicago by S. D. KIMBARK, &c; to 84 Michigan Ave.

MIDVALE STEEL WORKS.

Works and Office, NICETOWN, PHILADELPHIA, PA.

MANUFACTURERS OF

CRUCIBLE AND OPEN HEARTH STEEL,

Steel Locomotive and Car Wheel Tires. Steel Axles of every description.

STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.

Solid Steel Castings, Hammer Dies, Frogs, Crossings, etc.

BEST TOOL, MACHINERY AND SPRING STEELS.

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"THE IRONMONGER" was established in 1859, and is the oldest and only representative organ of the Iron, Hardware and Metal Trades. This Journal stands pre-eminent amongst trade publications, and possesses all the advantages of the Commercial News-paper and a high-class Literary Magazine. The principal characteristics of "THE IRONMONGER" are the accuracy of its Market Reports and Prices Current; the intrinsic value of its Home, Foreign and Colonial Correspondence; the impartiality of its criticism upon the leading novelties of the day; its careful selection of Agricultural, Legal and Magisterial News appertaining to the Metal Trades; the completeness of its list of Patents and general statistics, and its multiplicity of classified Advertisements. The main object of this publication is to furnish a faithful record of all things of specific value to those interested in the manufacture, purchase, consignment, shipment or sale of Hardware, Arms and Ammunition, Oils, Seeds, Implements, Machinery and Metals.

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SPECIALTIES.—Forged and Cast Cast Steel Plow Points, Shovel Plow Blades, Harrow and Cultivator Teeth, and Crow Bars of any pattern to order.

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LOOK WELL TO YOUR HORSE'S FEET.



was broken off, leaving the silver in the foot; *lockjaw* ensued, from which the horse died. Upon dissecting the foot a portion of the nail was found to have penetrated through the Coffin bone, as seen in Fig. 2, letter A thus sacrificing the life of a valuable animal.

It requires but little observation and reflection, one would think, to arrive at the conclusion as to the kind of nail to be used in the horse's foot; whether the mangled piece of iron, rendered DANGEROUS by the *Cold Rolling* or *Shearing* process, or the rod at a welding heat, where all the fibres remain intact, and a perfect *oneness* maintained, and which being pointed by the hammer, every nail is inspected, rendering such an accident as silversing utterly impossible.

The foot is the most important member of the animal's body, to which the greatest care and attention should be directed, when it becomes injured or deceased, no matter how perfect or sound the other parts may be. The horse's services are diminished, altogether lost. Hence the value of a horse depends upon the condition of his feet. "NO FOOT NO HORSE."

As the remedy lies with the owner of the horse, it is for him to prohibit any cold-rolled or sheared nails being driven in his horse's feet. The only Hot-Drawn and Hammered-Pure Iron Nail, now in use, is the PUTNAM NAIL. See that your horse is shod with this nail and avoid all risks. For sale by all dealers in Horse Nails.



The above drawing was made from a nail, showing the lamination of iron in the *Cold Rolled* and *Shearing* process.

We have known several cases in which valuable horses have been badly lamed by the use of *Cold Rolled* and *Sheared* horse shoe nails. We have used the same nails and been compelled to banish them from our shop. The Hot Forging process is the only sure manner of making a true driving and safe nail.

REV. W. H. H. MURRAY, *Golden Rule*, October 31, 1877.

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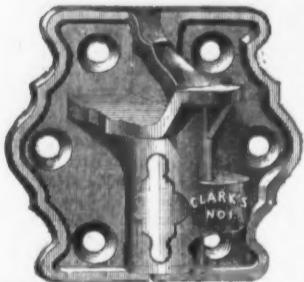
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Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the lock from being opened unless brought to proper position by the Key.

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Mortise Night Latches, Ornamental Bronze Fronts and Knobs,

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THE GENUINE

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Our goods have been very much improved recently, by making the Bar **WIDE**, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

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NEW PATENT

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Which cannot be forced back into the handle.

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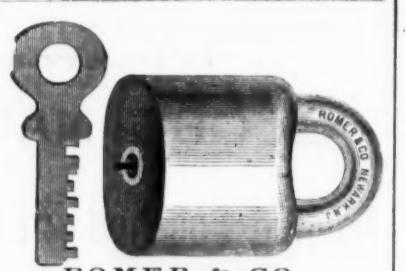
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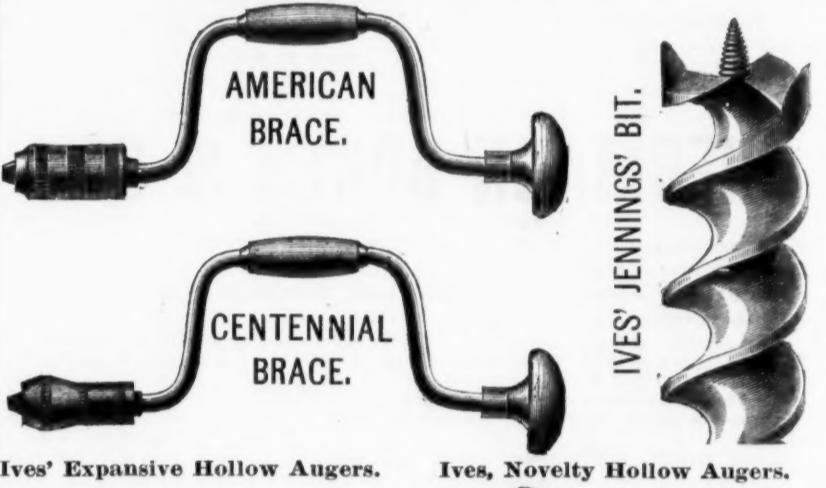
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Machine and Plow Bolts,

FORGED SET SCREWS,

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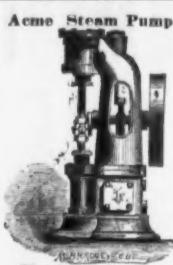




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Manufacturers,

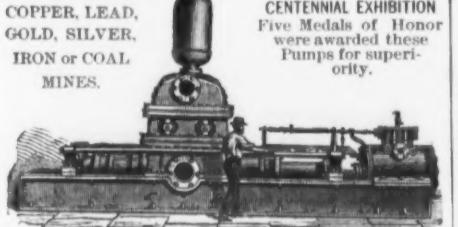
Wright's Patent. Easthampton, - Massachusetts.



Knowles' Patent Improved Mining Pumps.

For draining
COPPER, LEAD,
GOLD, SILVER,
IRON or COAL
MINES.

AT THE
CENTENNIAL EXHIBITION
Five Medals of Honor
were awarded these
Pumps for superi-
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Arranged with Special Reference
to Working Water Contain-
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or Acid.

Pumps of capacity of over one million gallons
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entirely without shock or jar, the entire
stoppages of Pump aggregating less than
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ADDRESS
Knowles' Steam Pump Works,
92 & 94 Liberty St., New York.

Send for Illustrated and Descriptive Circular of the

FIRMENICH PATENT



SAFETY STEAM BOILER.

The Boiler that made the Best, Dryest, Hottest and Greatest Quantity of Steam per pound of coal at the Centennial Exhibition, and received the Highest Award therefor,

A DIPLOMA AND MEDAL,



AND HAS THE FOLLOWING SUPERIOR ADVANTAGES:

No cleaning of flues, no hard firing caused thereby, and no corrosion caused by the accumulation of soot. Safety from disastrous explosion. The Utmost Durability. Economy, being the most economical boiler in the world. No foaming or priming; entirely dry steam.

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THORNE, DeHAVEN & CO., Drilling Machines,
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PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
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Double and Single Gate, $\frac{1}{2}$ in. to 48 in.—outside and inside Screws, Indicator, &c.
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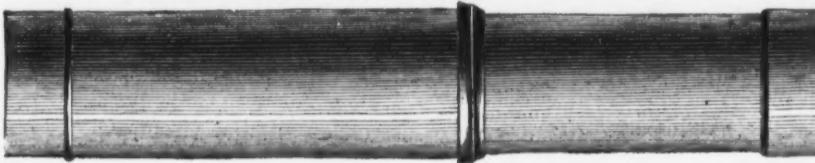
For Chain Pumps.



PAT. OCT. 13, 1868.
PAT. FEB. 29, 1870.
RE'D. JUNE 12, 1877.

L. M. RUMSEY & CO., 811 North Main Street, St. Louis, Mo., U. S. A.

THE GRAHAM ADJUSTABLE STOVE PIPE.



(Pat. Jan. 9, 1877.)

Medal Awarded at American Institute, 1877.

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THE EAGLE ANVIL !! WARRANTED !!



(ESTABLISHED) 1843.

These Anvils are superior to the best English, or other Anvils, on account of the better proportion of the steel face, and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" when using a wrought iron anvil.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage, that being of a more solid material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a hammer one-half lighter than required when using a wrought iron anvil.

The working surface is in one piece of JESUP'S BEST TOOL CAST STEEL, which being accurately ground, is hardened and given the proper temper for the heaviest work. The horn is covered with and its extremity made entirely of steel. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is warranted to be thoroughly welded and not to come off.

Price List, October 1st, 1876. ANVILS weighing 100 lbs. to 900 lbs. per lb.
No. 5 lb. 10 lb. 15 lb. 20 lb. 30 lb. 40 lb. 50 lb. 60 lb. 70 lb. 80 lb. 90 lb.
Weighting about \$2.25 \$2.75 \$3.25 \$4.00 \$4.50 \$5.25 \$6.00 \$6.75 \$7.25 \$8.00 \$8.50
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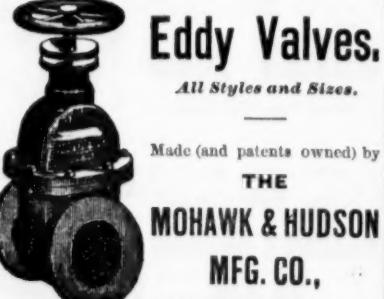
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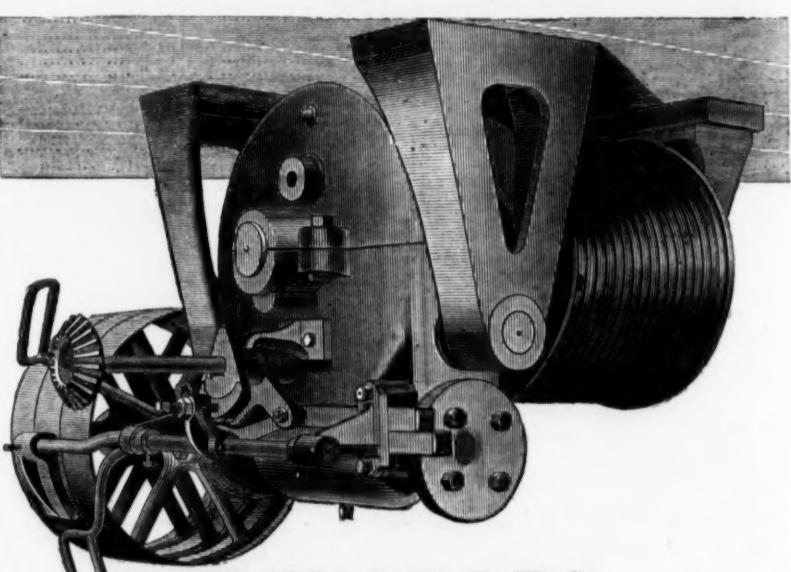
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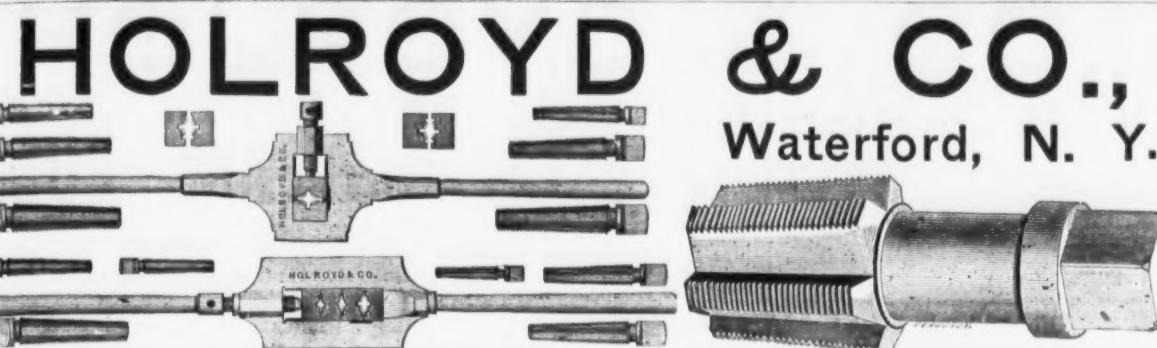
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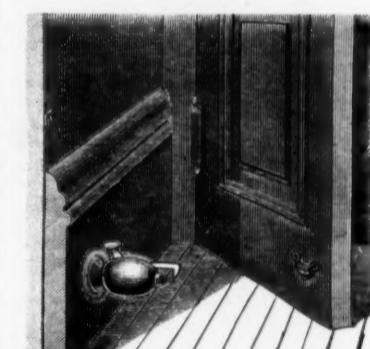
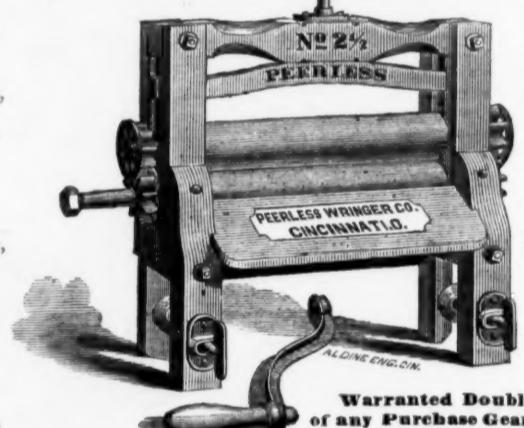
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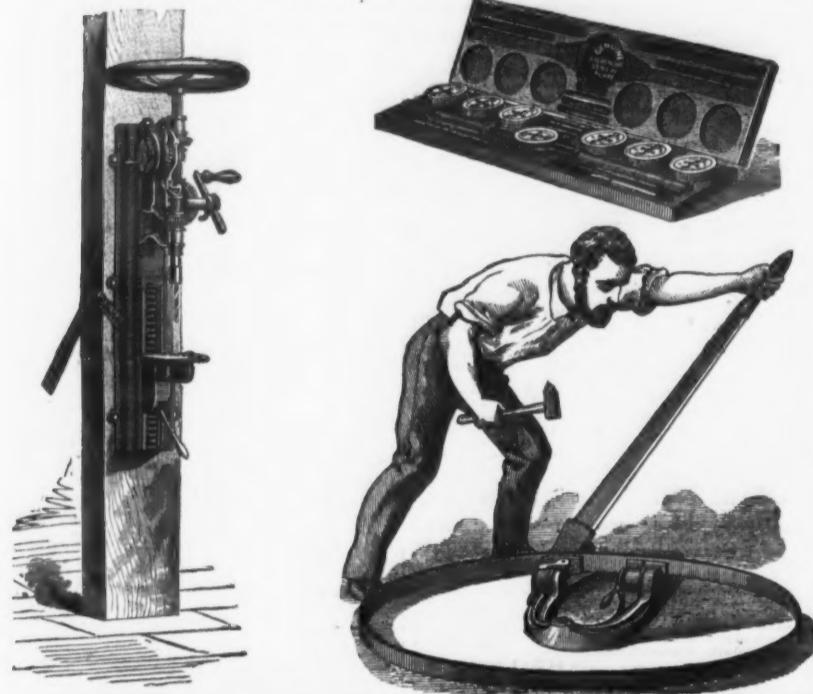
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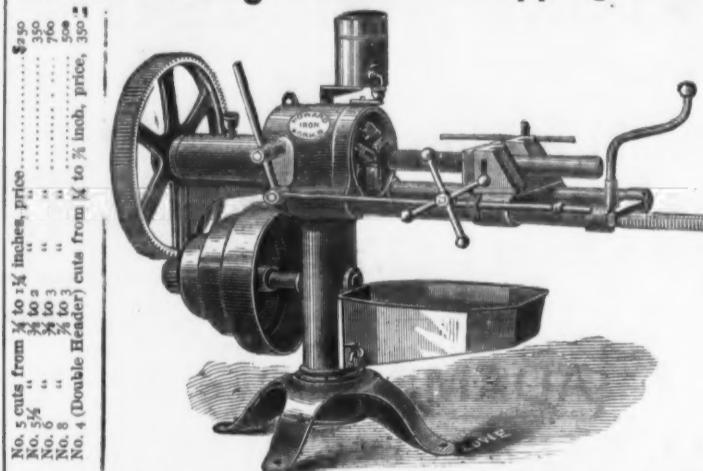
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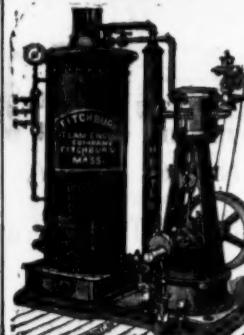
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1 1/2	26.00	29.00	2.25	2	30.00	32.00
2	31.00	35.00	2.75	2 1/2	36.00	41.00
2 1/2	40.00	45.00	3.50	3	45.00	51.00
3	50.00	57.00	4.25	3 1/2	59.00	67.00
4	60.00	70.00	5.00	4	60.00	70.00
4 1/2	68.00	79.00	5.50	5	70.00	80.00
5	90.00	101.00	6.00	5 1/2	105.00	117.00
6	120.00	133.00	7.00	6	120.00	133.00
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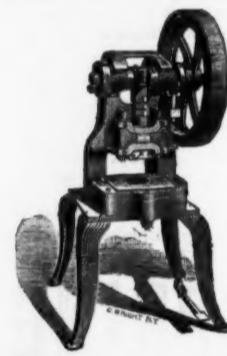
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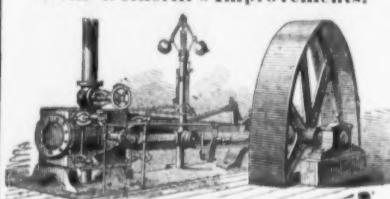
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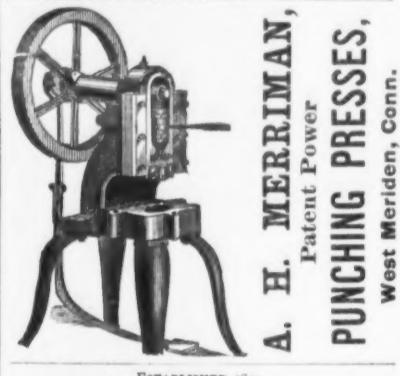
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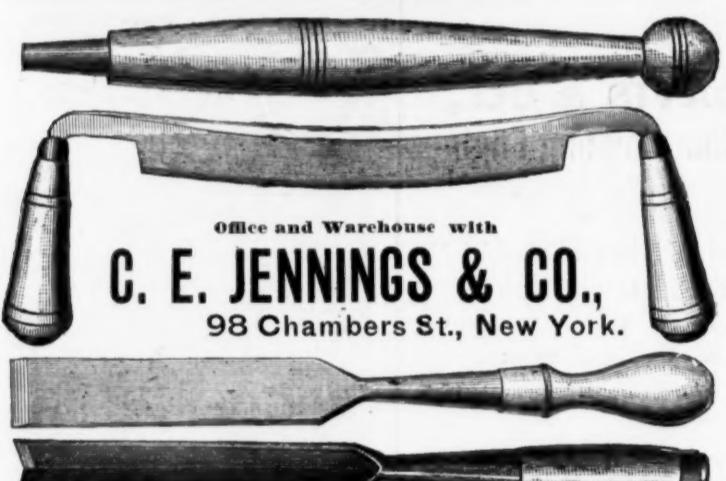
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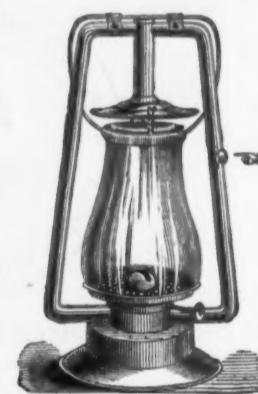
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